Fig. 1

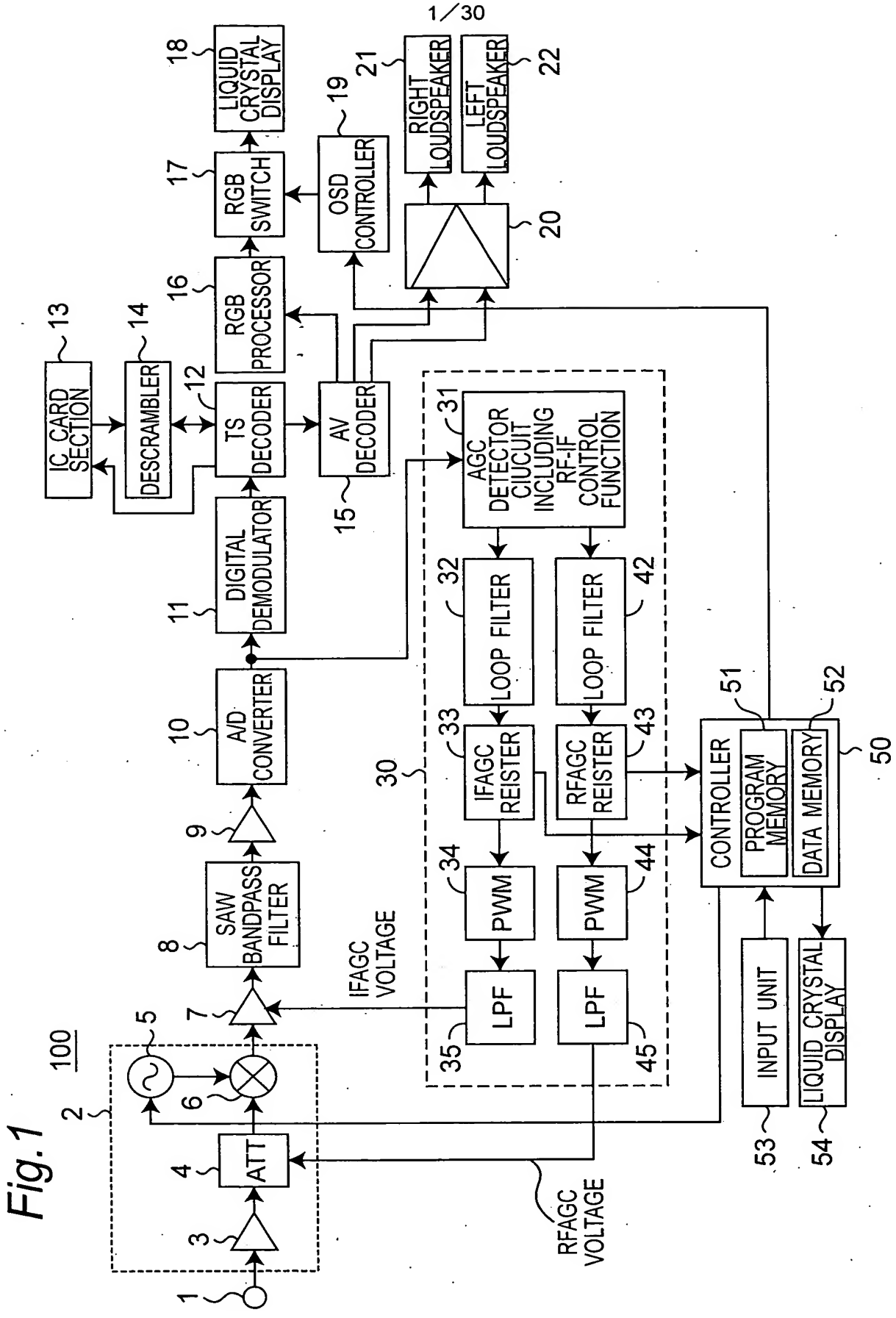
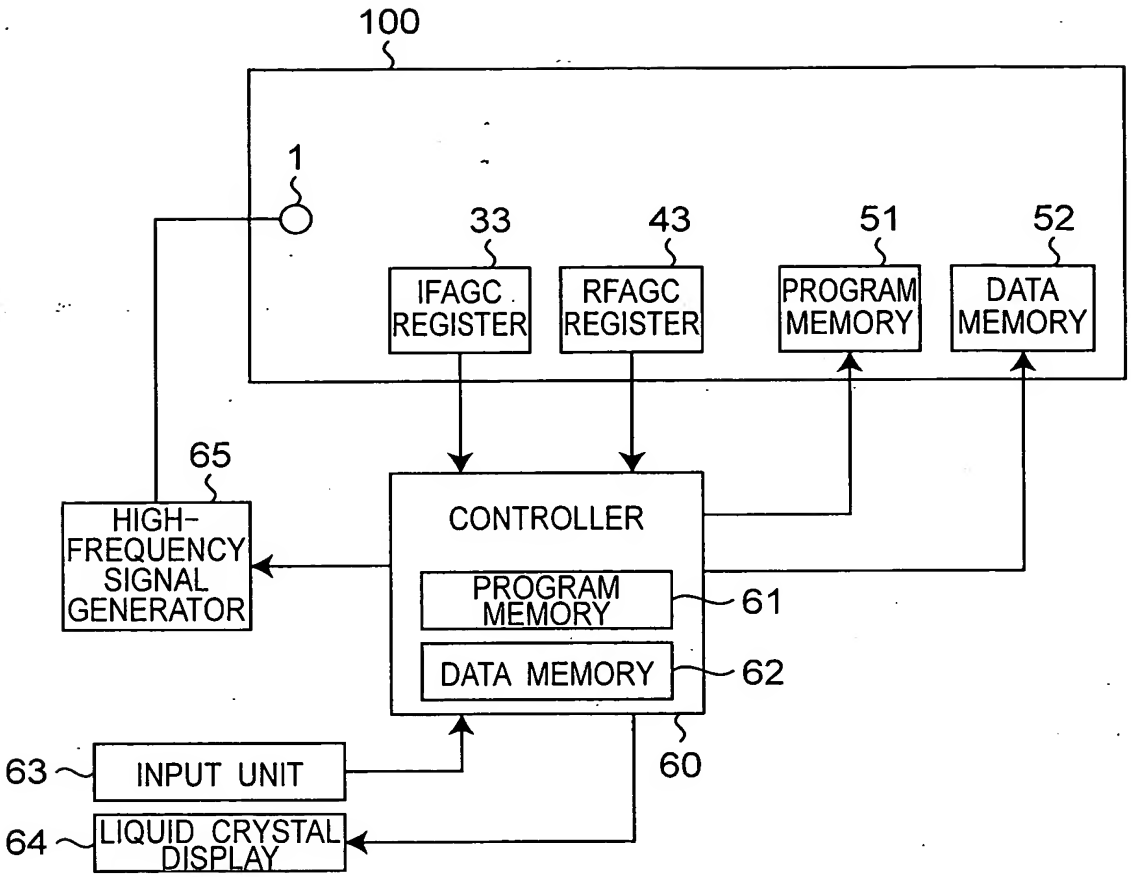

100
1
2
3
4
ATT
5
6
7
8
SAW BANDPASS FILTER
9
10
A/D CONVERTER
11
DIGITAL DEMODULATOR
12
TS DECODER
13
IC CARD SECTION
14
DESCRAMBLER
15
AV DECODER
16
RGB PROCESSOR
17
RGB SWITCH
18
LIQUID CRYSTAL DISPLAY
19
OSD CONTROLLER
20
21
RIGHT LOUDSPEAKER
22
LEFT LOUDSPEAKER
30
31
AGC DETECTOR CIUCUIT INCLUDING RF-IF CONTROL FUNCTION
32
LOOP FILTER
33
IFAGC REISTER
34
PWM
35
LPF
42
LOOP FILTER
43
RFAGC REISTER
44
PWM
45
LPF
50
51
CONTROLLER
52
PROGRAM MEMORY
DATA MEMORY
53
INPUT UNIT
54
LIQUID CRYSTAL DISPLAY
IFAGC VOLTAGE
RFAGC VOLTAGE

Fig.2


100
1
33
43
51
52
IFAGC REGISTER
RFAGC REGISTER
PROGRAM MEMORY
DATA MEMORY
65
HIGH-FREQUENCY SIGNAL GENERATOR
CONTROLLER
PROGRAM MEMORY
61
DATA MEMORY
62
60
63
INPUT UNIT
64
LIQUID CRYSTAL DISPLAY

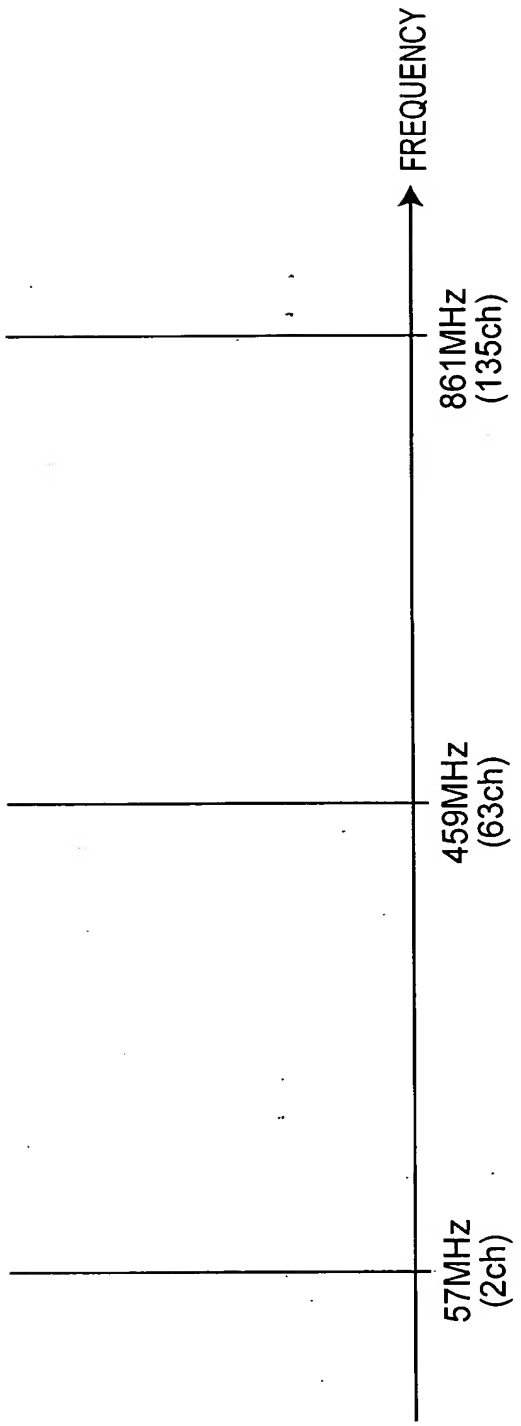


Fig.3

Fig.4

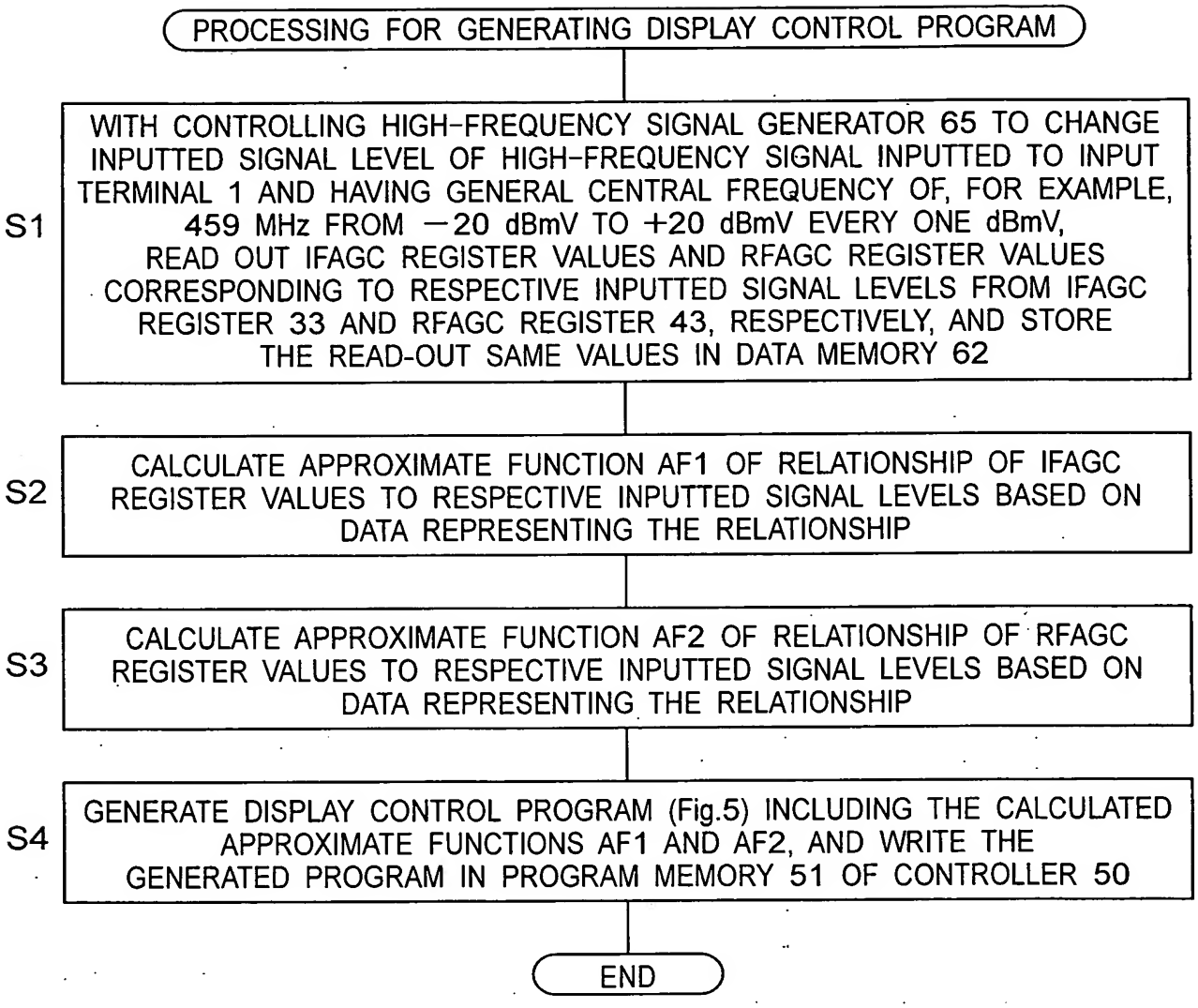

PROCESSING FOR GENERATING DISPLAY CONTROL PROGRAM
S1
WITH CONTROLLING HIGH-FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH-FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 AND HAVING GENERAL CENTRAL FREQUENCY OF, FOR EXAMPLE, 459 MHz FROM −20 dBmV TO +20 dBmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
S2
CALCULATE APPROXIMATE FUNCTION AF1 OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS BASED ON DATA REPRESENTING THE RELATIONSHIP
S3
CALCULATE APPROXIMATE FUNCTION AF2 OF RELATIONSHIP OF RFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS BASED ON DATA REPRESENTING THE RELATIONSHIP
S4
GENERATE DISPLAY CONTROL PROGRAM (Fig.5) INCLUDING THE CALCULATED APPROXIMATE FUNCTIONS AF1 AND AF2, AND WRITE THE GENERATED PROGRAM IN PROGRAM MEMORY 51 OF CONTROLLER 50
END

Fig.5

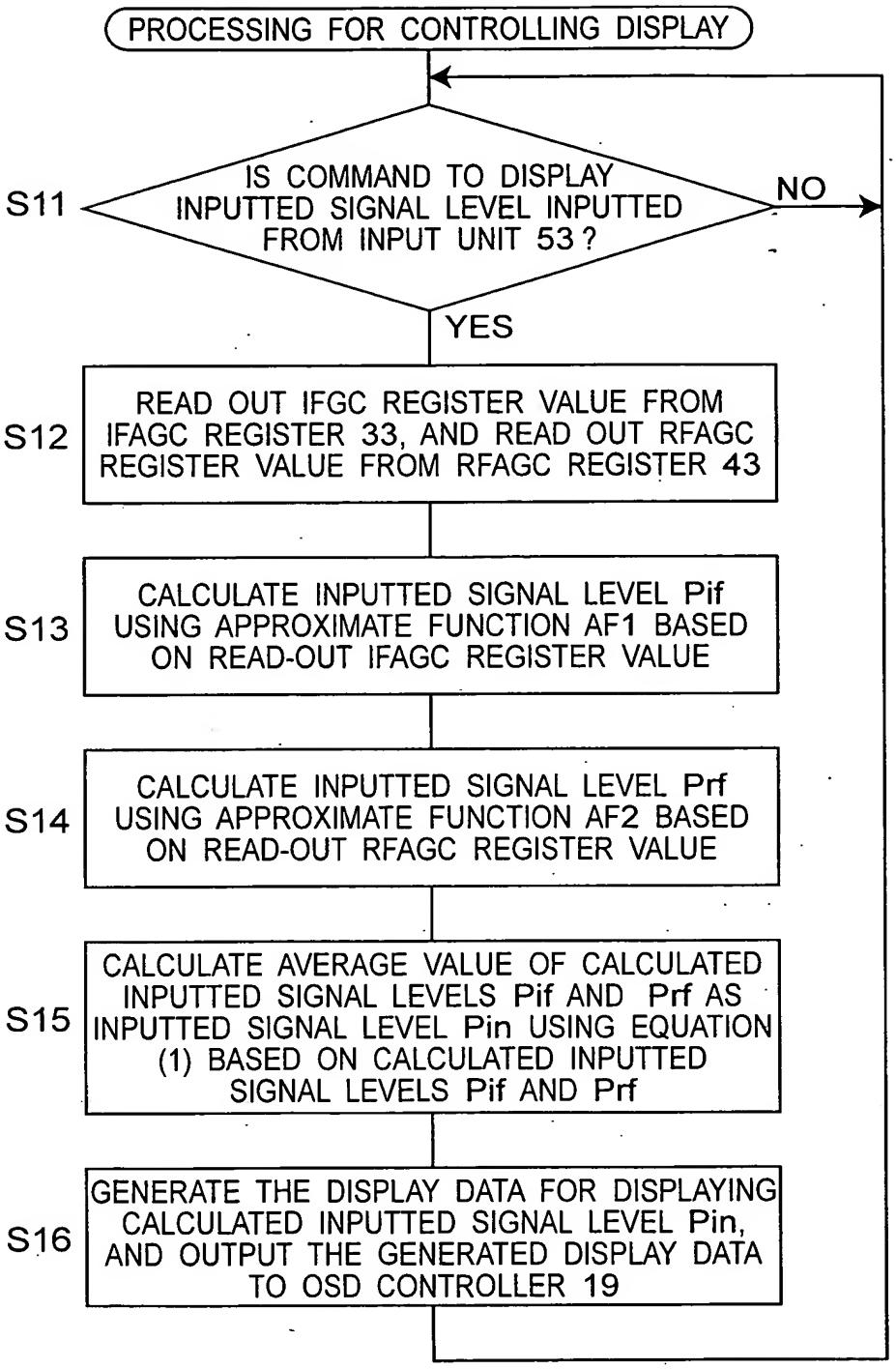
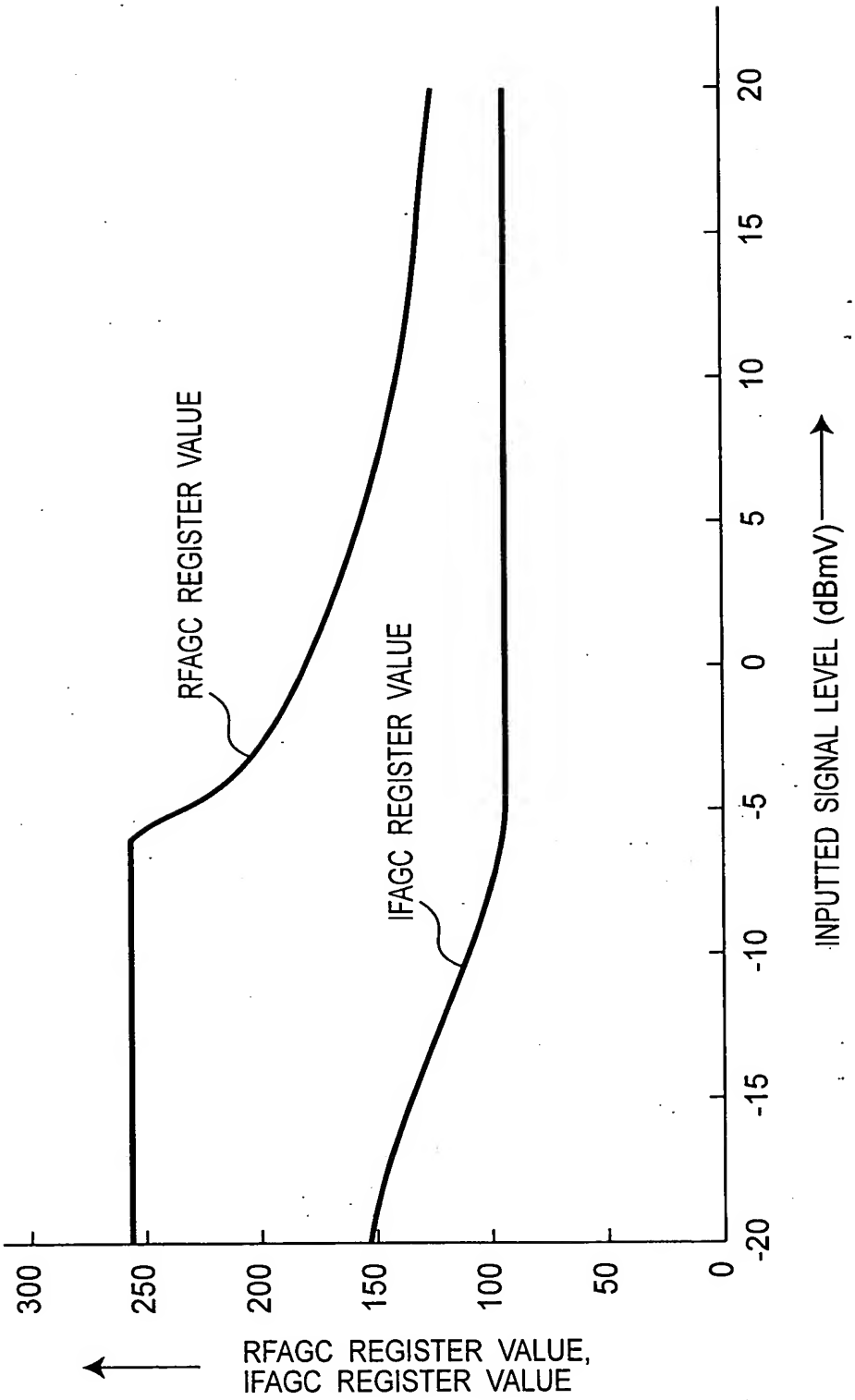

PROCESSING FOR CONTROLLING DISPLAY
S11
IS COMMAND TO DISPLAY INPUTTED SIGNAL LEVEL INPUTTED FROM INPUT UNIT 53 ?
NO
YES
S12
READ OUT IFGC REGISTER VALUE FROM IFAGC REGISTER 33, AND READ OUT RFAGC REGISTER VALUE FROM RFAGC REGISTER 43
S13
CALCULATE INPUTTED SIGNAL LEVEL Pif USING APPROXIMATE FUNCTION AF1 BASED ON READ-OUT IFAGC REGISTER VALUE
S14
CALCULATE INPUTTED SIGNAL LEVEL Prf USING APPROXIMATE FUNCTION AF2 BASED ON READ-OUT RFAGC REGISTER VALUE
S15
CALCULATE AVERAGE VALUE OF CALCULATED INPUTTED SIGNAL LEVELS Pif AND Prf AS INPUTTED SIGNAL LEVEL Pin USING EQUATION (1) BASED ON CALCULATED INPUTTED SIGNAL LEVELS Pif AND Prf
S16
GENERATE THE DISPLAY DATA FOR DISPLAYING CALCULATED INPUTTED SIGNAL LEVEL Pin, AND OUTPUT THE GENERATED DISPLAY DATA TO OSD CONTROLLER 19

Fig.6


RFAGC REGISTER VALUE
IFAGC REGISTER VALUE
300
250
200
150
100
50
0
RFAGC REGISTER VALUE,
IFAGC REGISTER VALUE
-20
-15
-10
-5
0
5
10
15
20
INPUTTED SIGNAL LEVEL (dBmV)

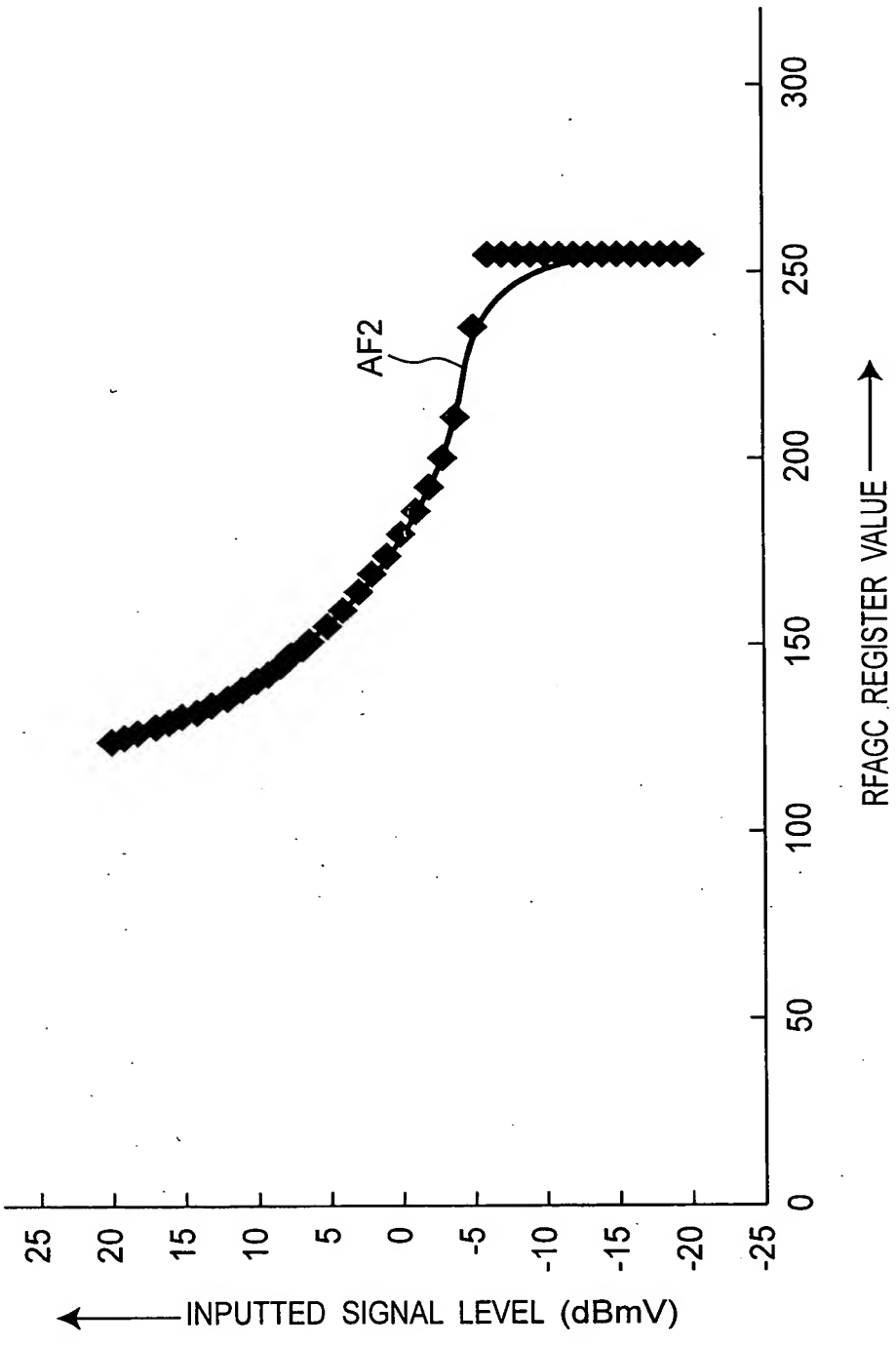

AF2
300
250
200
150
100
50
0
RFAGC REGISTER VALUE
25
20
15
10
5
0
-5
-10
-15
-20
-25
INPUTTED SIGNAL LEVEL (dBmV)

Fig.7

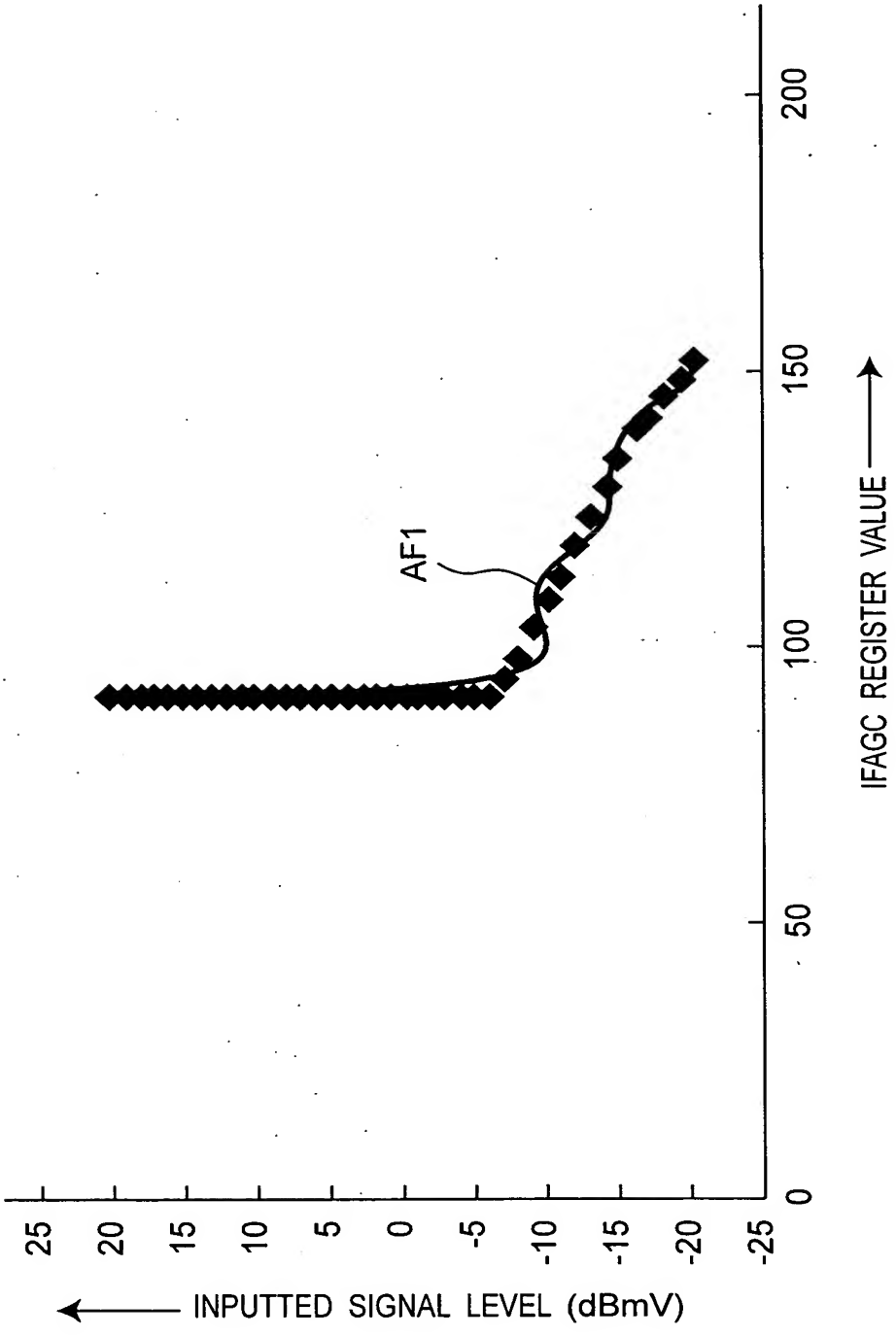

AF1
25
20
15
10
5
0
-5
-10
-15
-20
-25
INPUTTED SIGNAL LEVEL (dBmV)
0
50
100
150
200
IFAGC REGISTER VALUE

Fig.8

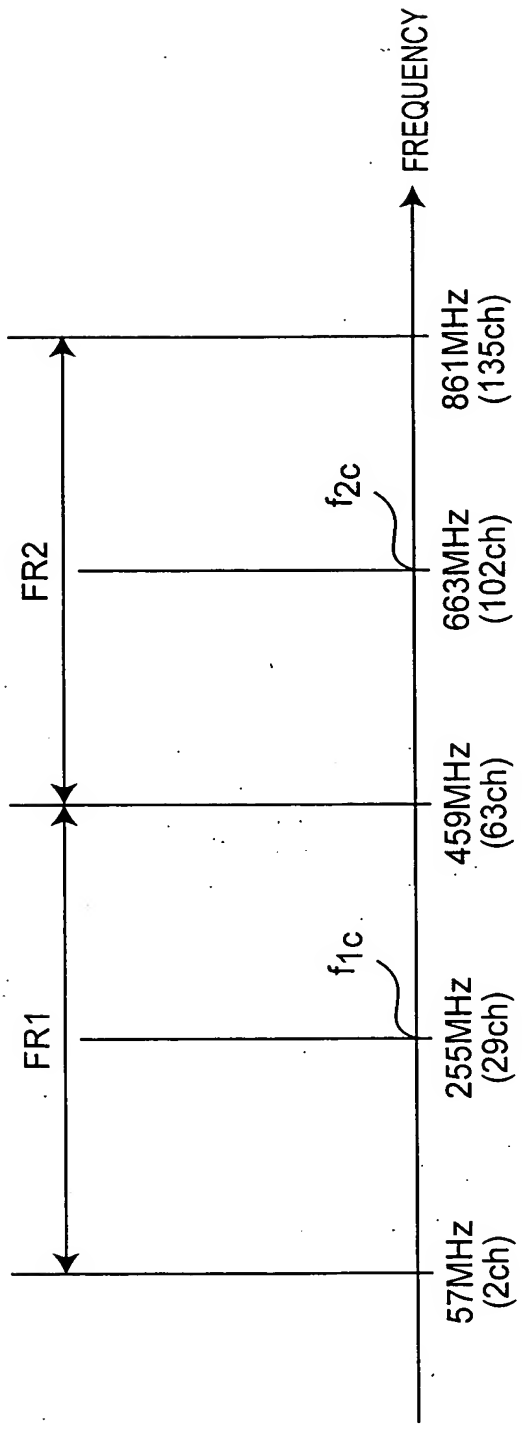

FREQUENCY
861MHz
(135ch)
663MHz
(102ch)
459MHz
(63ch)
255MHz
(29ch)
57MHz
(2ch)
FR2
FR1
f2c
f1c

Fig.9

Fig.10

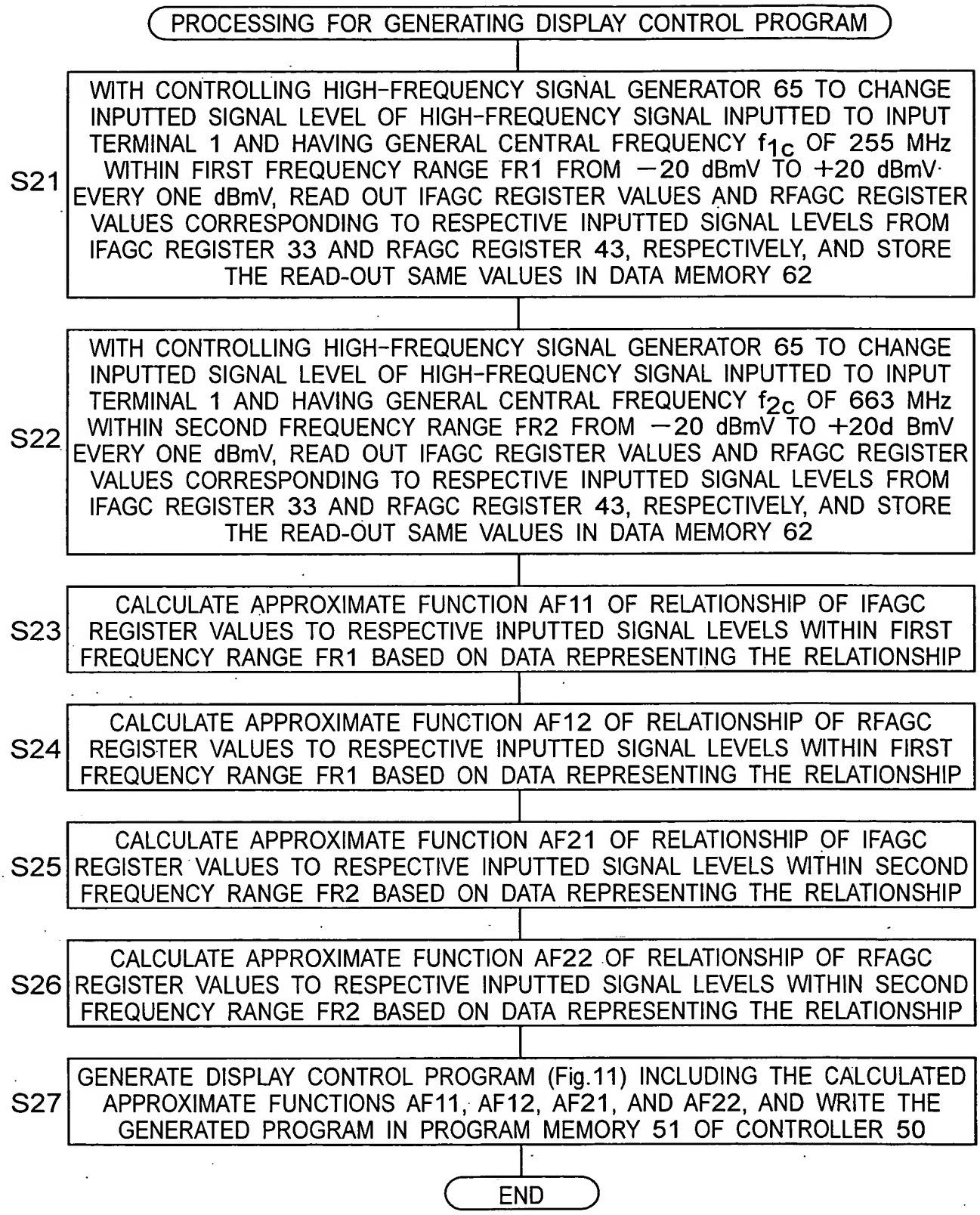
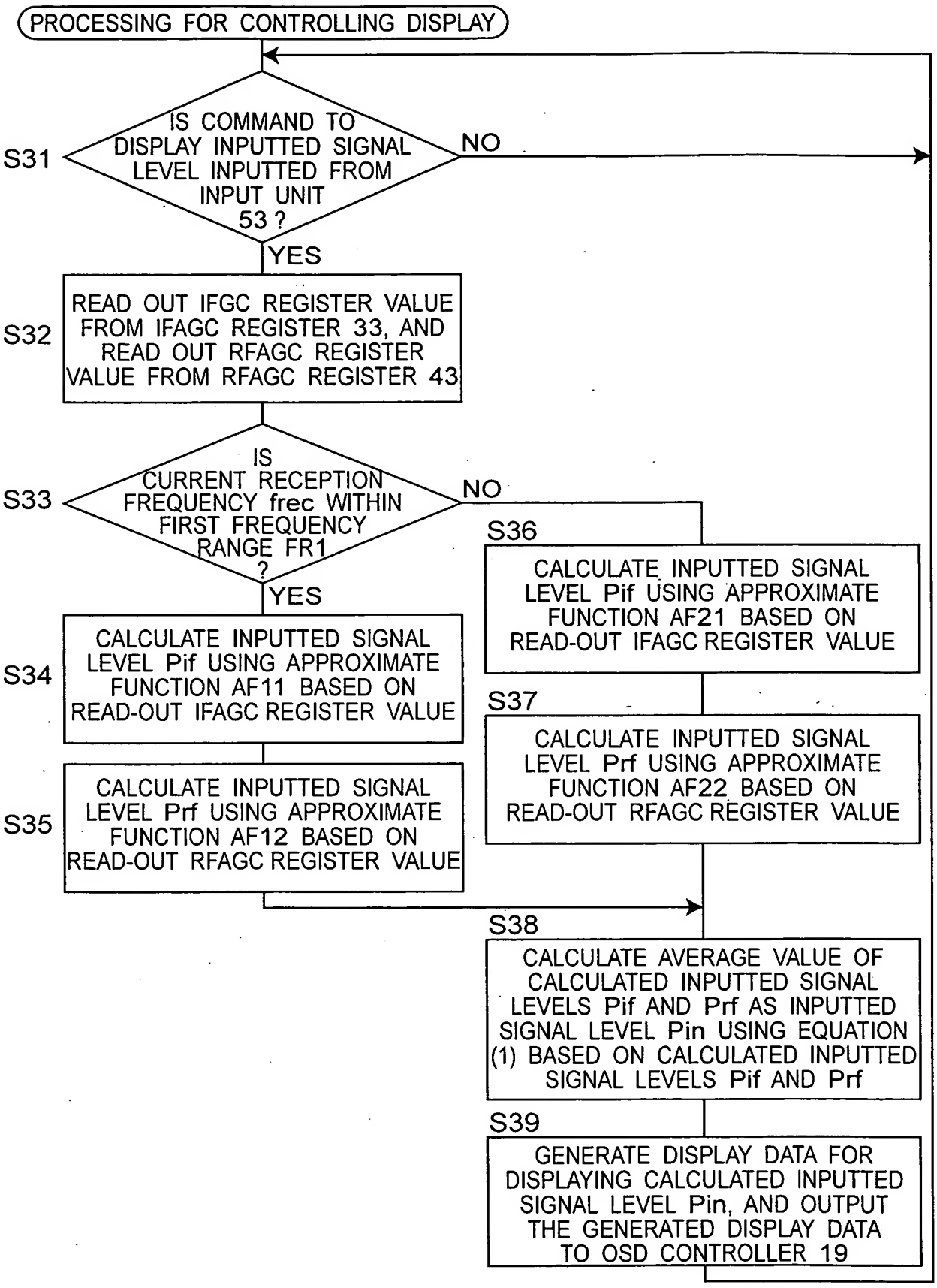

PROCESSING FOR GENERATING DISPLAY CONTROL PROGRAM
S21
WITH CONTROLLING HIGH-FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH-FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 AND HAVING GENERAL CENTRAL FREQUENCY f_{1c} OF 255 MHz WITHIN FIRST FREQUENCY RANGE FR1 FROM −20 dBmV TO +20 dBmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
S22
WITH CONTROLLING HIGH-FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH-FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 AND HAVING GENERAL CENTRAL FREQUENCY f_{2c} OF 663 MHz WITHIN SECOND FREQUENCY RANGE FR2 FROM −20 dBmV TO +20d BmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
S23
CALCULATE APPROXIMATE FUNCTION AF11 OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN FIRST FREQUENCY RANGE FR1 BASED ON DATA REPRESENTING THE RELATIONSHIP
S24
CALCULATE APPROXIMATE FUNCTION AF12 OF RELATIONSHIP OF RFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN FIRST FREQUENCY RANGE FR1 BASED ON DATA REPRESENTING THE RELATIONSHIP
S25
CALCULATE APPROXIMATE FUNCTION AF21 OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN SECOND FREQUENCY RANGE FR2 BASED ON DATA REPRESENTING THE RELATIONSHIP
S26
CALCULATE APPROXIMATE FUNCTION AF22 OF RELATIONSHIP OF RFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN SECOND FREQUENCY RANGE FR2 BASED ON DATA REPRESENTING THE RELATIONSHIP
S27
GENERATE DISPLAY CONTROL PROGRAM (Fig.11) INCLUDING THE CALCULATED APPROXIMATE FUNCTIONS AF11, AF12, AF21, AND AF22, AND WRITE THE GENERATED PROGRAM IN PROGRAM MEMORY 51 OF CONTROLLER 50
END

Fig. 11


PROCESSING FOR CONTROLLING DISPLAY
S31
IS COMMAND TO DISPLAY INPUTTED SIGNAL LEVEL INPUTTED FROM INPUT UNIT 53 ?
NO
YES
S32
READ OUT IFGC REGISTER VALUE FROM IFAGC REGISTER 33, AND READ OUT RFAGC REGISTER VALUE FROM RFAGC REGISTER 43
S33
IS CURRENT RECEPTION FREQUENCY frec WITHIN FIRST FREQUENCY RANGE FR1 ?
NO
YES
S34
CALCULATE INPUTTED SIGNAL LEVEL Pif USING APPROXIMATE FUNCTION AF11 BASED ON READ-OUT IFAGC REGISTER VALUE
S35
CALCULATE INPUTTED SIGNAL LEVEL Prf USING APPROXIMATE FUNCTION AF12 BASED ON READ-OUT RFAGC REGISTER VALUE
S36
CALCULATE INPUTTED SIGNAL LEVEL Pif USING APPROXIMATE FUNCTION AF21 BASED ON READ-OUT IFAGC REGISTER VALUE
S37
CALCULATE INPUTTED SIGNAL LEVEL Prf USING APPROXIMATE FUNCTION AF22 BASED ON READ-OUT RFAGC REGISTER VALUE
S38
CALCULATE AVERAGE VALUE OF CALCULATED INPUTTED SIGNAL LEVELS Pif AND Prf AS INPUTTED SIGNAL LEVEL Pin USING EQUATION (1) BASED ON CALCULATED INPUTTED SIGNAL LEVELS Pif AND Prf
S39
GENERATE DISPLAY DATA FOR DISPLAYING CALCULATED INPUTTED SIGNAL LEVEL Pin, AND OUTPUT THE GENERATED DISPLAY DATA TO OSD CONTROLLER 19

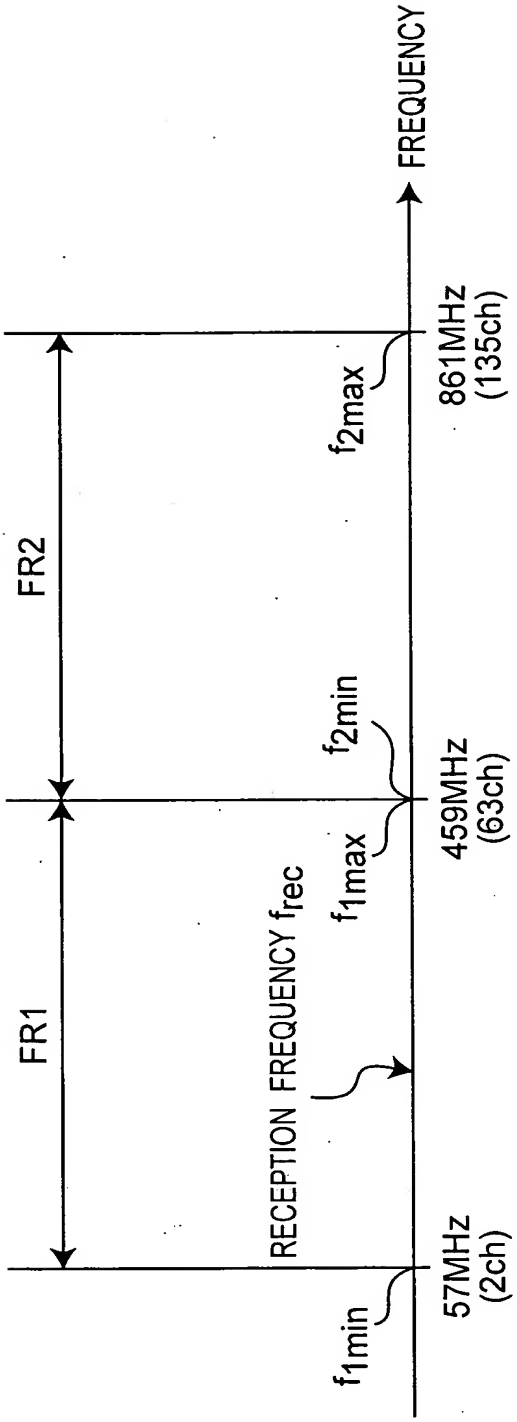

FREQUENCY
861MHz
(135ch)
459MHz
(63ch)
57MHz
(2ch)
FR2
FR1
f2max
f2min
f1max
f1min
RECEPTION FREQUENCY frec

Fig.12

Fig.13

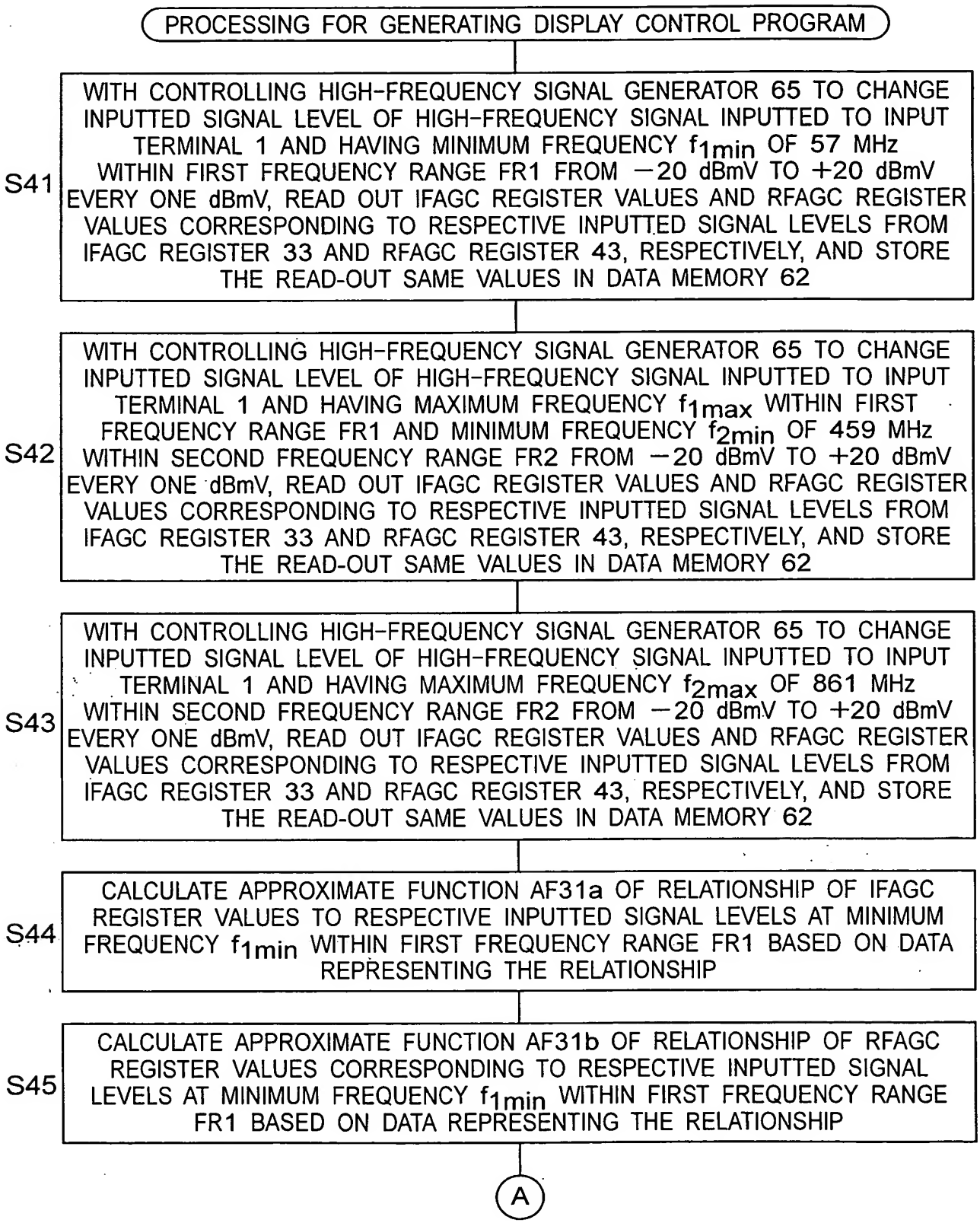

PROCESSING FOR GENERATING DISPLAY CONTROL PROGRAM
S41
WITH CONTROLLING HIGH-FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH-FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 AND HAVING MINIMUM FREQUENCY f_{1min} OF 57 MHz WITHIN FIRST FREQUENCY RANGE FR1 FROM −20 dBmV TO +20 dBmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
S42
WITH CONTROLLING HIGH-FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH-FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 AND HAVING MAXIMUM FREQUENCY f_{1max} WITHIN FIRST FREQUENCY RANGE FR1 AND MINIMUM FREQUENCY f_{2min} OF 459 MHz WITHIN SECOND FREQUENCY RANGE FR2 FROM −20 dBmV TO +20 dBmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
S43
WITH CONTROLLING HIGH-FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH-FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 AND HAVING MAXIMUM FREQUENCY f_{2max} OF 861 MHz WITHIN SECOND FREQUENCY RANGE FR2 FROM −20 dBmV TO +20 dBmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
S44
CALCULATE APPROXIMATE FUNCTION AF31a OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS AT MINIMUM FREQUENCY f_{1min} WITHIN FIRST FREQUENCY RANGE FR1 BASED ON DATA REPRESENTING THE RELATIONSHIP
S45
CALCULATE APPROXIMATE FUNCTION AF31b OF RELATIONSHIP OF RFAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS AT MINIMUM FREQUENCY f_{1min} WITHIN FIRST FREQUENCY RANGE FR1 BASED ON DATA REPRESENTING THE RELATIONSHIP
A

Fig.14

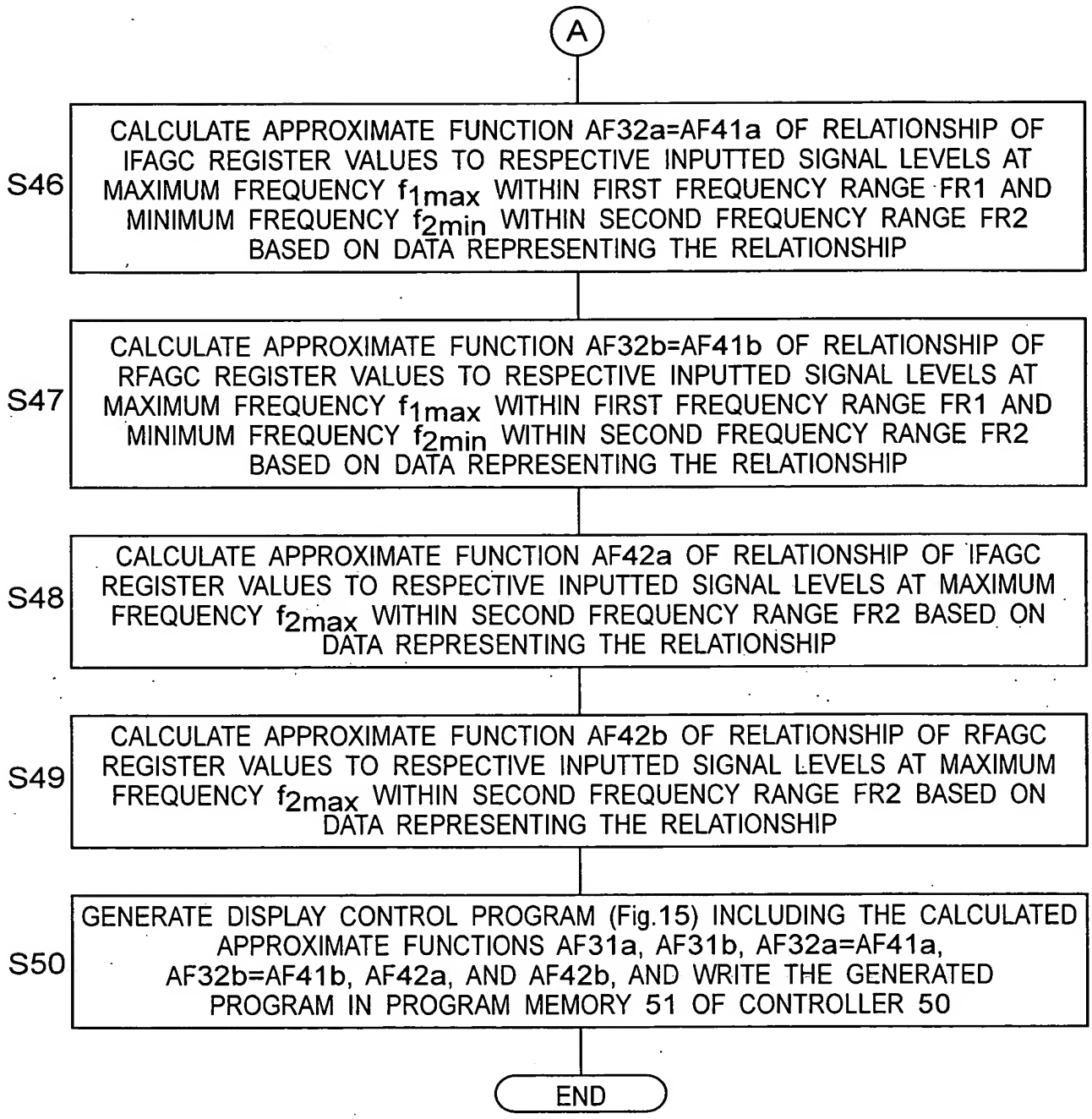

A
S46
CALCULATE APPROXIMATE FUNCTION AF32a=AF41a OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS AT MAXIMUM FREQUENCY f_{1max} WITHIN FIRST FREQUENCY RANGE FR1 AND MINIMUM FREQUENCY f_{2min} WITHIN SECOND FREQUENCY RANGE FR2 BASED ON DATA REPRESENTING THE RELATIONSHIP
S47
CALCULATE APPROXIMATE FUNCTION AF32b=AF41b OF RELATIONSHIP OF RFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS AT MAXIMUM FREQUENCY f_{1max} WITHIN FIRST FREQUENCY RANGE FR1 AND MINIMUM FREQUENCY f_{2min} WITHIN SECOND FREQUENCY RANGE FR2 BASED ON DATA REPRESENTING THE RELATIONSHIP
S48
CALCULATE APPROXIMATE FUNCTION AF42a OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS AT MAXIMUM FREQUENCY f_{2max} WITHIN SECOND FREQUENCY RANGE FR2 BASED ON DATA REPRESENTING THE RELATIONSHIP
S49
CALCULATE APPROXIMATE FUNCTION AF42b OF RELATIONSHIP OF RFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS AT MAXIMUM FREQUENCY f_{2max} WITHIN SECOND FREQUENCY RANGE FR2 BASED ON DATA REPRESENTING THE RELATIONSHIP
S50
GENERATE DISPLAY CONTROL PROGRAM (Fig.15) INCLUDING THE CALCULATED APPROXIMATE FUNCTIONS AF31a, AF31b, AF32a=AF41a, AF32b=AF41b, AF42a, AND AF42b, AND WRITE THE GENERATED PROGRAM IN PROGRAM MEMORY 51 OF CONTROLLER 50
END

Fig.15

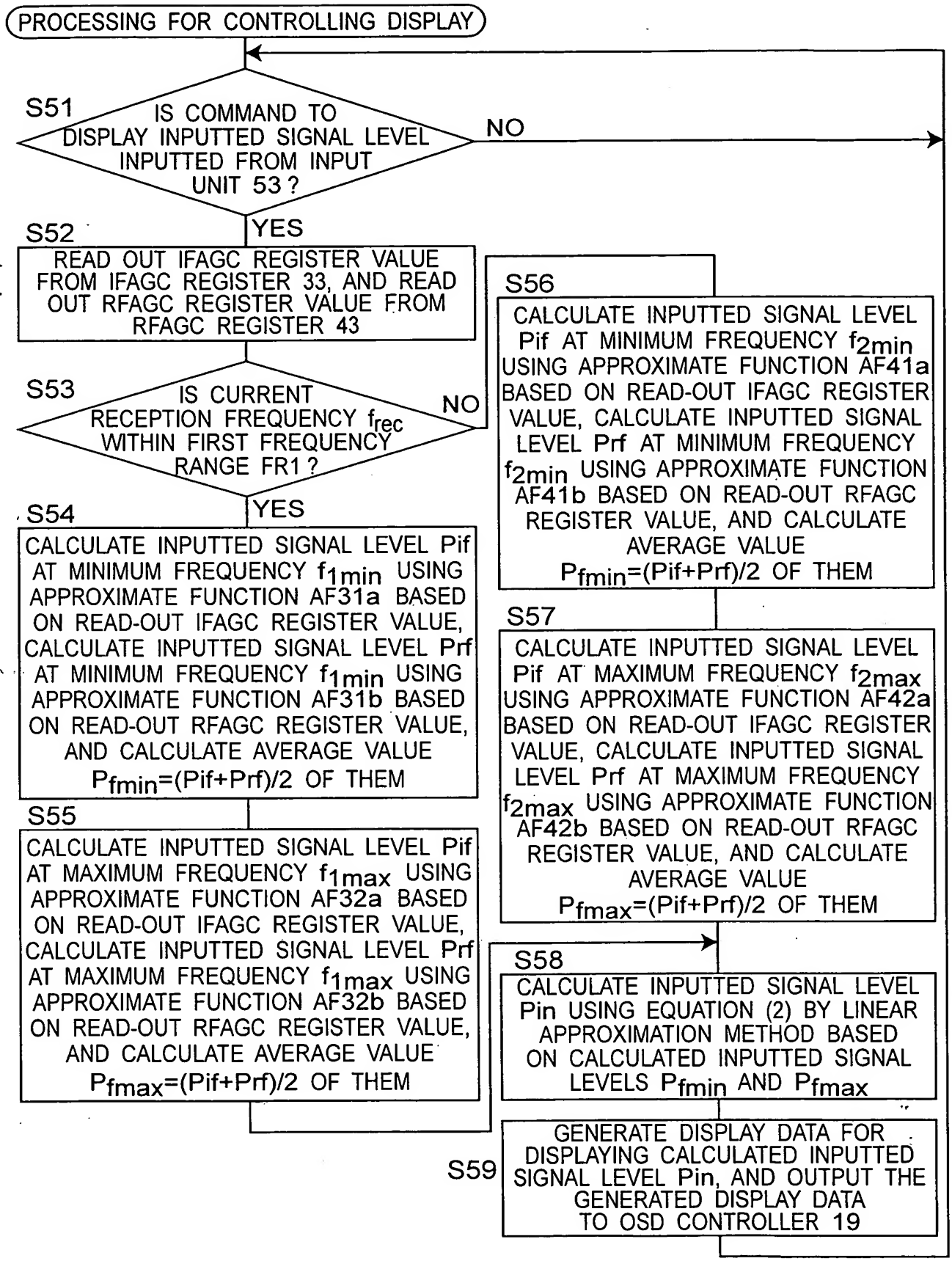

PROCESSING FOR CONTROLLING DISPLAY
S51
IS COMMAND TO DISPLAY INPUTTED SIGNAL LEVEL INPUTTED FROM INPUT UNIT 53 ?
NO
YES
S52
READ OUT IFAGC REGISTER VALUE FROM IFAGC REGISTER 33, AND READ OUT RFAGC REGISTER VALUE FROM RFAGC REGISTER 43
S53
IS CURRENT RECEPTION FREQUENCY f_{rec} WITHIN FIRST FREQUENCY RANGE FR1 ?
NO
YES
S54
CALCULATE INPUTTED SIGNAL LEVEL Pif AT MINIMUM FREQUENCY f_{1min} USING APPROXIMATE FUNCTION AF31a BASED ON READ-OUT IFAGC REGISTER VALUE, CALCULATE INPUTTED SIGNAL LEVEL Prf AT MINIMUM FREQUENCY f_{1min} USING APPROXIMATE FUNCTION AF31b BASED ON READ-OUT RFAGC REGISTER VALUE, AND CALCULATE AVERAGE VALUE $P_{fmin}=(Pif+Prf)/2$ OF THEM
S55
CALCULATE INPUTTED SIGNAL LEVEL Pif AT MAXIMUM FREQUENCY f_{1max} USING APPROXIMATE FUNCTION AF32a BASED ON READ-OUT IFAGC REGISTER VALUE, CALCULATE INPUTTED SIGNAL LEVEL Prf AT MAXIMUM FREQUENCY f_{1max} USING APPROXIMATE FUNCTION AF32b BASED ON READ-OUT RFAGC REGISTER VALUE, AND CALCULATE AVERAGE VALUE $P_{fmax}=(Pif+Prf)/2$ OF THEM
S56
CALCULATE INPUTTED SIGNAL LEVEL Pif AT MINIMUM FREQUENCY f_{2min} USING APPROXIMATE FUNCTION AF41a BASED ON READ-OUT IFAGC REGISTER VALUE, CALCULATE INPUTTED SIGNAL LEVEL Prf AT MINIMUM FREQUENCY f_{2min} USING APPROXIMATE FUNCTION AF41b BASED ON READ-OUT RFAGC REGISTER VALUE, AND CALCULATE AVERAGE VALUE $P_{fmin}=(Pif+Prf)/2$ OF THEM
S57
CALCULATE INPUTTED SIGNAL LEVEL Pif AT MAXIMUM FREQUENCY f_{2max} USING APPROXIMATE FUNCTION AF42a BASED ON READ-OUT IFAGC REGISTER VALUE, CALCULATE INPUTTED SIGNAL LEVEL Prf AT MAXIMUM FREQUENCY f_{2max} USING APPROXIMATE FUNCTION AF42b BASED ON READ-OUT RFAGC REGISTER VALUE, AND CALCULATE AVERAGE VALUE $P_{fmax}=(Pif+Prf)/2$ OF THEM
S58
CALCULATE INPUTTED SIGNAL LEVEL Pin USING EQUATION (2) BY LINEAR APPROXIMATION METHOD BASED ON CALCULATED INPUTTED SIGNAL LEVELS P_{fmin} AND P_{fmax}
S59
GENERATE DISPLAY DATA FOR DISPLAYING CALCULATED INPUTTED SIGNAL LEVEL Pin, AND OUTPUT THE GENERATED DISPLAY DATA TO OSD CONTROLLER 19

Fig.16

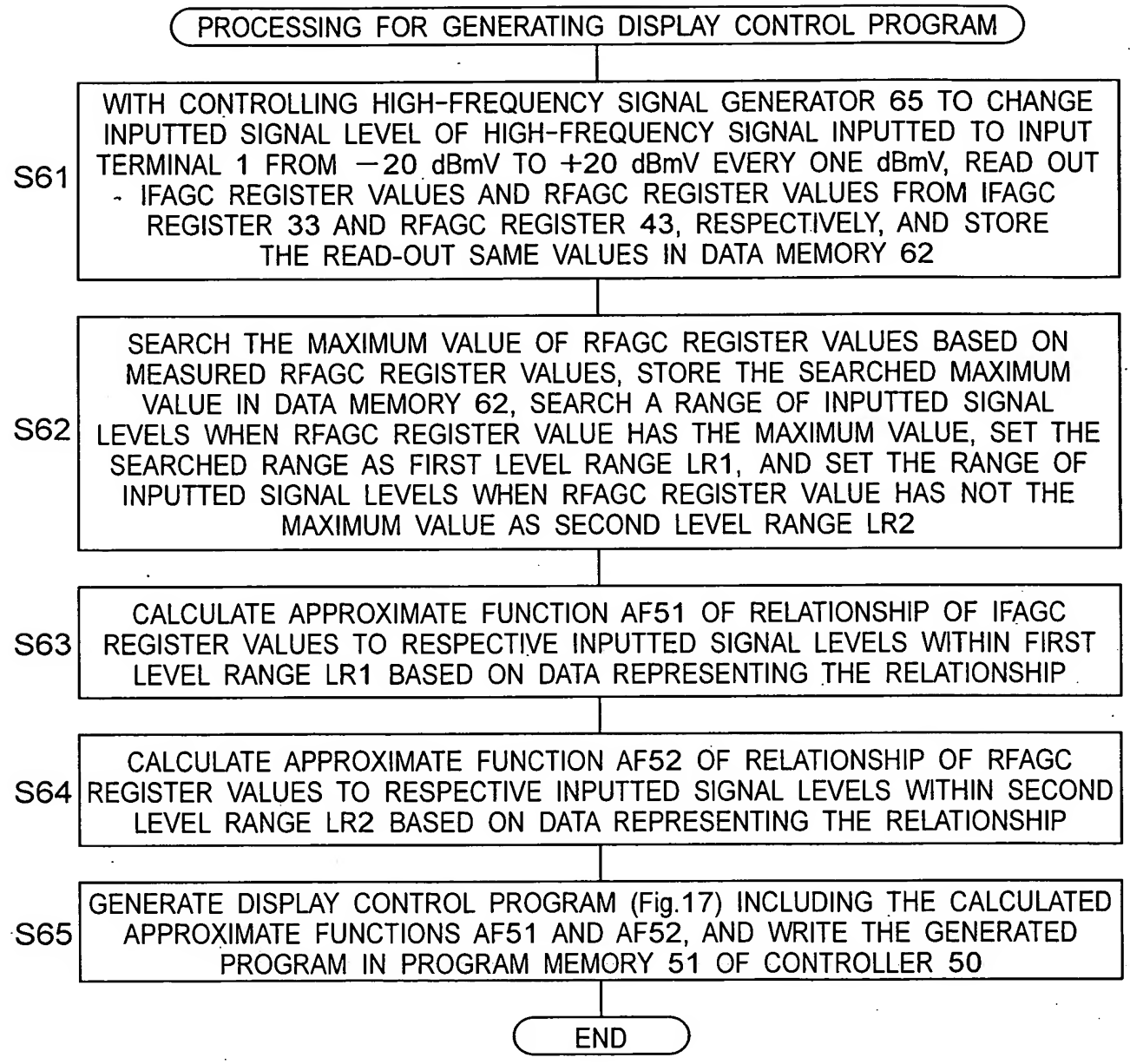
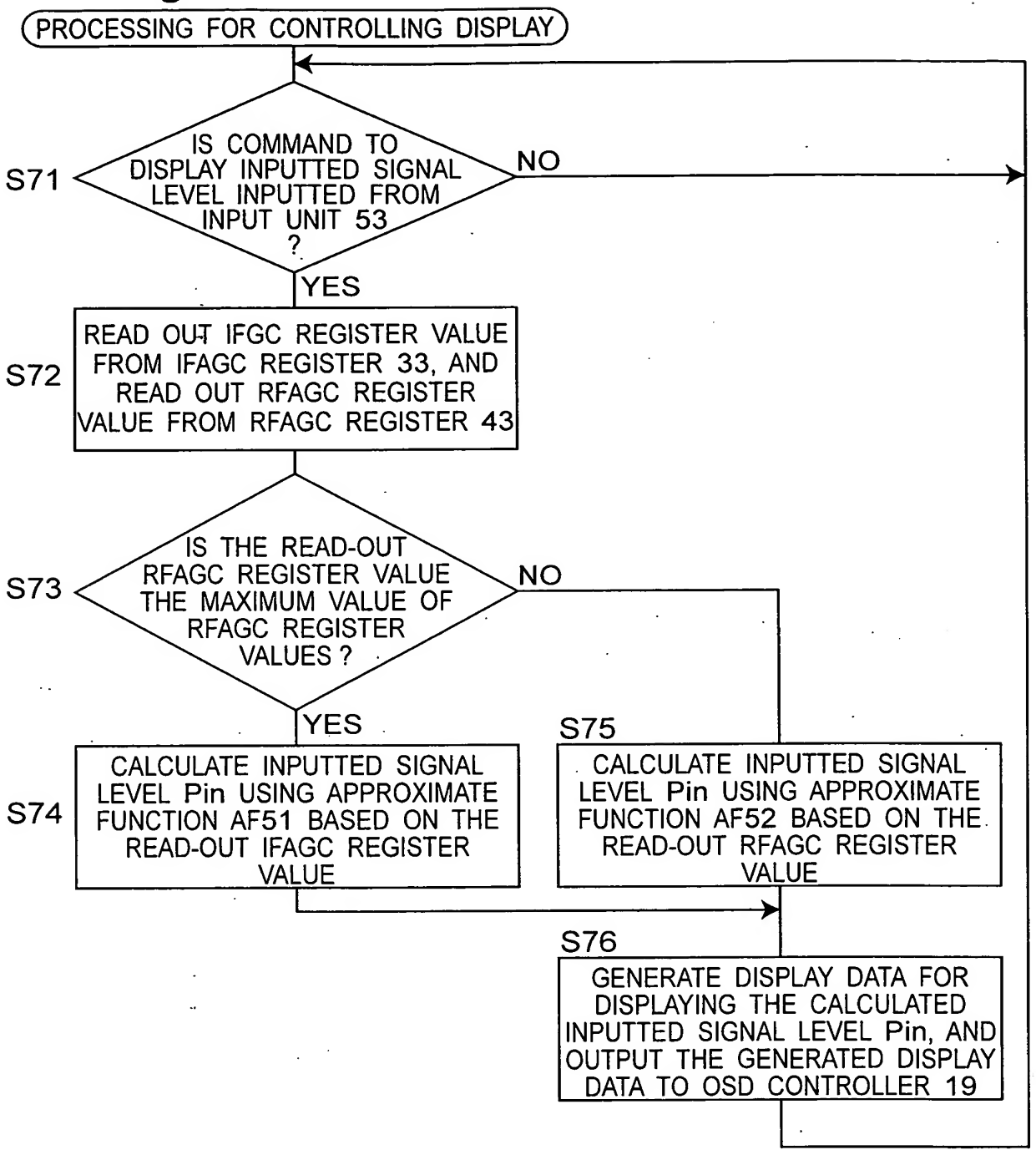

PROCESSING FOR GENERATING DISPLAY CONTROL PROGRAM
S61
WITH CONTROLLING HIGH-FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH-FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 FROM −20 dBmV TO +20 dBmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFAGC REGISTER VALUES FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
S62
SEARCH THE MAXIMUM VALUE OF RFAGC REGISTER VALUES BASED ON MEASURED RFAGC REGISTER VALUES, STORE THE SEARCHED MAXIMUM VALUE IN DATA MEMORY 62, SEARCH A RANGE OF INPUTTED SIGNAL LEVELS WHEN RFAGC REGISTER VALUE HAS THE MAXIMUM VALUE, SET THE SEARCHED RANGE AS FIRST LEVEL RANGE LR1, AND SET THE RANGE OF INPUTTED SIGNAL LEVELS WHEN RFAGC REGISTER VALUE HAS NOT THE MAXIMUM VALUE AS SECOND LEVEL RANGE LR2
S63
CALCULATE APPROXIMATE FUNCTION AF51 OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN FIRST LEVEL RANGE LR1 BASED ON DATA REPRESENTING THE RELATIONSHIP
S64
CALCULATE APPROXIMATE FUNCTION AF52 OF RELATIONSHIP OF RFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN SECOND LEVEL RANGE LR2 BASED ON DATA REPRESENTING THE RELATIONSHIP
S65
GENERATE DISPLAY CONTROL PROGRAM (Fig.17) INCLUDING THE CALCULATED APPROXIMATE FUNCTIONS AF51 AND AF52, AND WRITE THE GENERATED PROGRAM IN PROGRAM MEMORY 51 OF CONTROLLER 50
END

Fig.17


PROCESSING FOR CONTROLLING DISPLAY
S71
IS COMMAND TO DISPLAY INPUTTED SIGNAL LEVEL INPUTTED FROM INPUT UNIT 53 ?
NO
YES
S72
READ OUT IFGC REGISTER VALUE FROM IFAGC REGISTER 33, AND READ OUT RFAGC REGISTER VALUE FROM RFAGC REGISTER 43
S73
IS THE READ-OUT RFAGC REGISTER VALUE THE MAXIMUM VALUE OF RFAGC REGISTER VALUES ?
NO
YES
S74
CALCULATE INPUTTED SIGNAL LEVEL Pin USING APPROXIMATE FUNCTION AF51 BASED ON THE READ-OUT IFAGC REGISTER VALUE
S75
CALCULATE INPUTTED SIGNAL LEVEL Pin USING APPROXIMATE FUNCTION AF52 BASED ON THE READ-OUT RFAGC REGISTER VALUE
S76
GENERATE DISPLAY DATA FOR DISPLAYING THE CALCULATED INPUTTED SIGNAL LEVEL Pin, AND OUTPUT THE GENERATED DISPLAY DATA TO OSD CONTROLLER 19

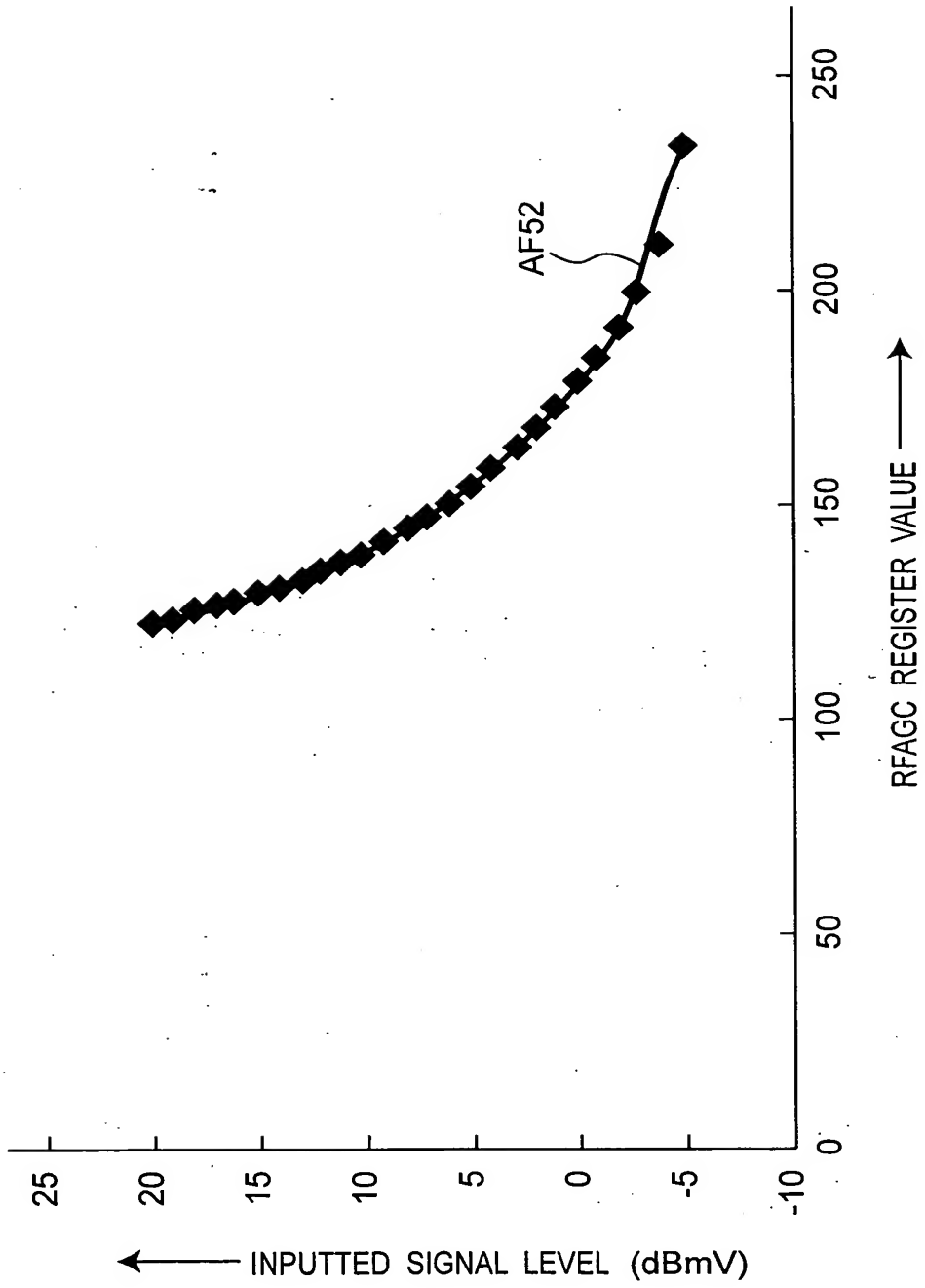

AF52
250
200
150
100
50
0
RFAGC REGISTER VALUE
25
20
15
10
5
0
-5
-10
INPUTTED SIGNAL LEVEL (dBmV)

Fig.18

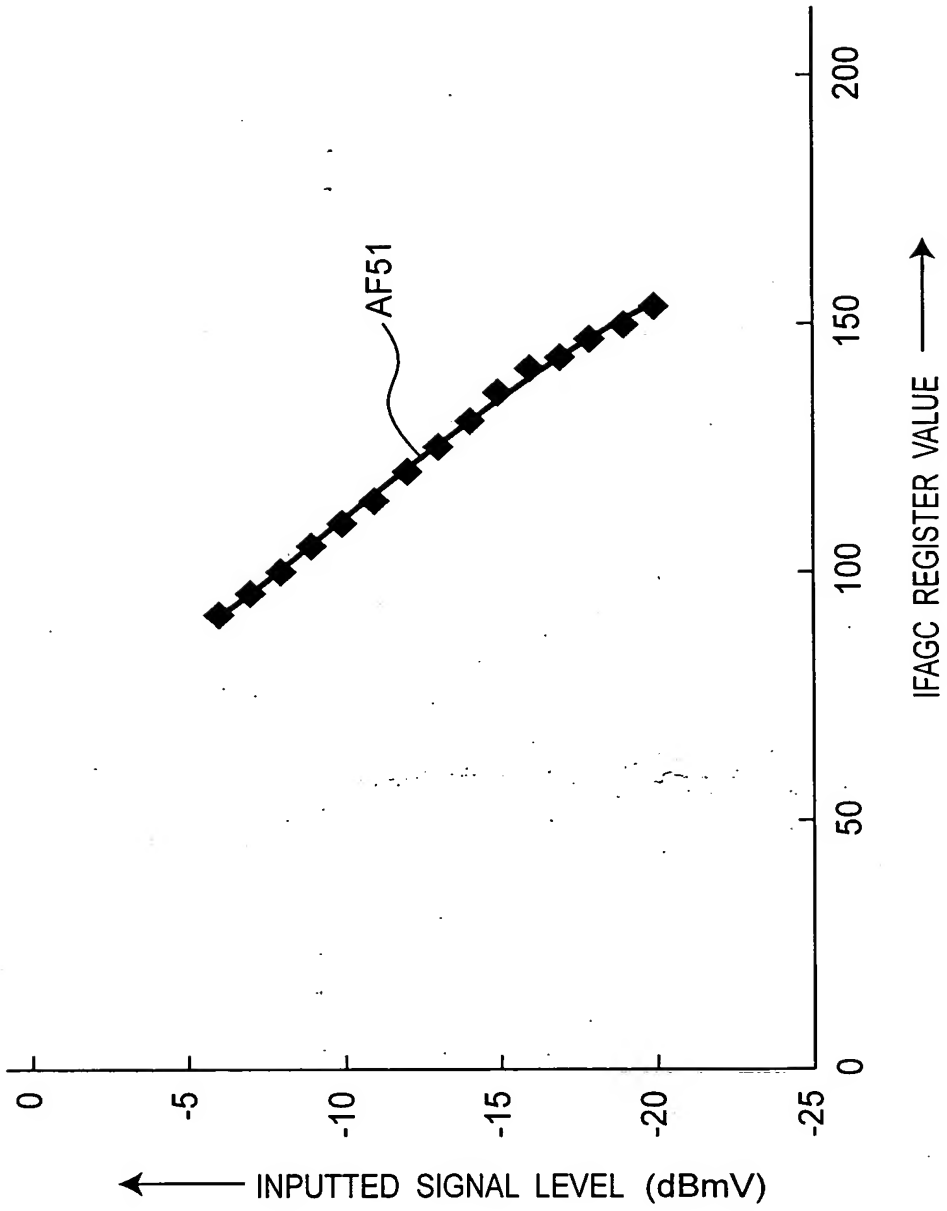

AF51
0
50
100
150
200
IFAGC REGISTER VALUE
0
-5
-10
-15
-20
-25
INPUTTED SIGNAL LEVEL (dBmV)

Fig.19

Fig.20

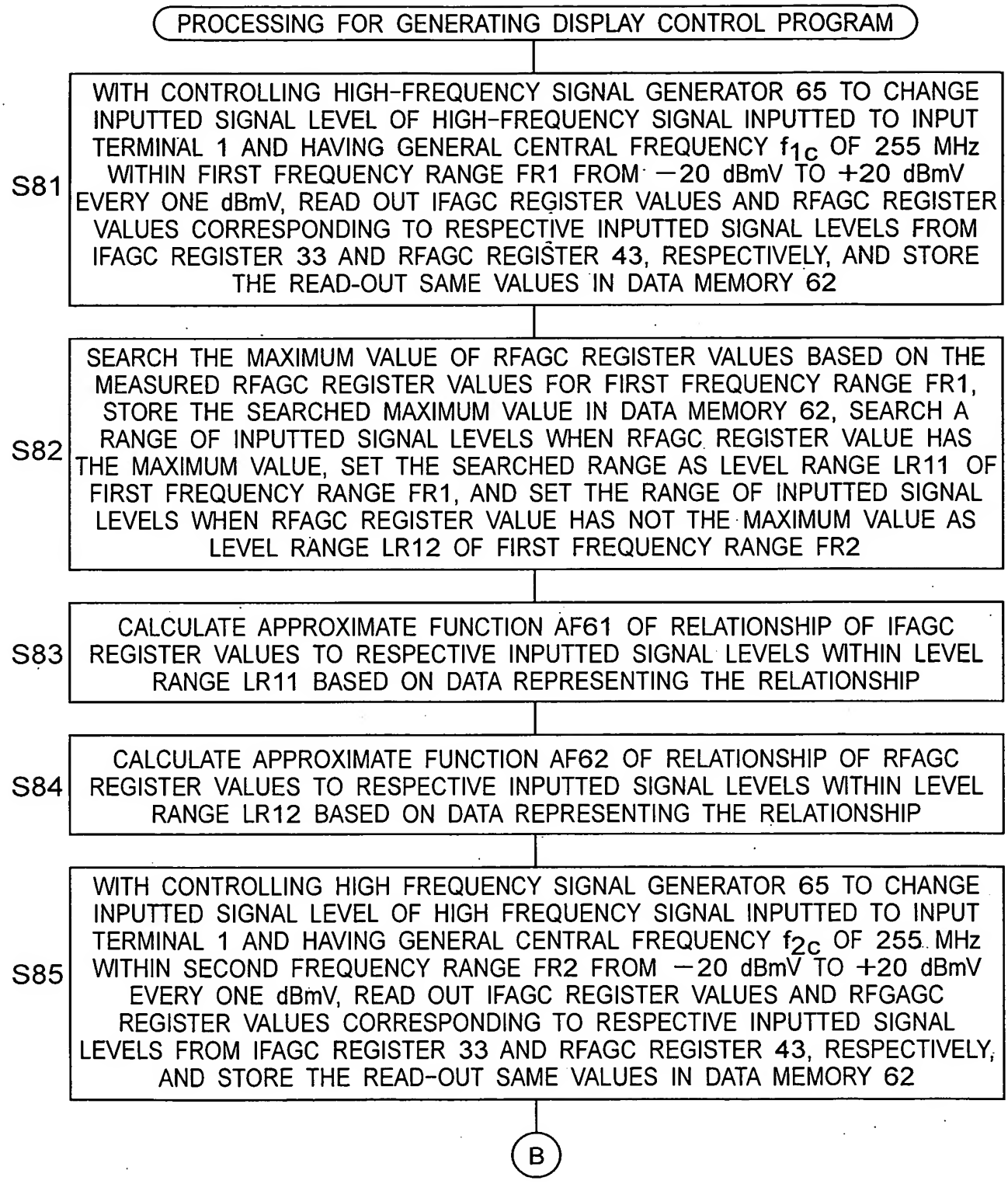

PROCESSING FOR GENERATING DISPLAY CONTROL PROGRAM
S81
WITH CONTROLLING HIGH-FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH-FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 AND HAVING GENERAL CENTRAL FREQUENCY f_{1c} OF 255 MHz WITHIN FIRST FREQUENCY RANGE FR1 FROM −20 dBmV TO +20 dBmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
S82
SEARCH THE MAXIMUM VALUE OF RFAGC REGISTER VALUES BASED ON THE MEASURED RFAGC REGISTER VALUES FOR FIRST FREQUENCY RANGE FR1, STORE THE SEARCHED MAXIMUM VALUE IN DATA MEMORY 62, SEARCH A RANGE OF INPUTTED SIGNAL LEVELS WHEN RFAGC REGISTER VALUE HAS THE MAXIMUM VALUE, SET THE SEARCHED RANGE AS LEVEL RANGE LR11 OF FIRST FREQUENCY RANGE FR1, AND SET THE RANGE OF INPUTTED SIGNAL LEVELS WHEN RFAGC REGISTER VALUE HAS NOT THE MAXIMUM VALUE AS LEVEL RANGE LR12 OF FIRST FREQUENCY RANGE FR2
S83
CALCULATE APPROXIMATE FUNCTION AF61 OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN LEVEL RANGE LR11 BASED ON DATA REPRESENTING THE RELATIONSHIP
S84
CALCULATE APPROXIMATE FUNCTION AF62 OF RELATIONSHIP OF RFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN LEVEL RANGE LR12 BASED ON DATA REPRESENTING THE RELATIONSHIP
S85
WITH CONTROLLING HIGH FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 AND HAVING GENERAL CENTRAL FREQUENCY f_{2c} OF 255 MHz WITHIN SECOND FREQUENCY RANGE FR2 FROM −20 dBmV TO +20 dBmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFGAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
B

Fig.21

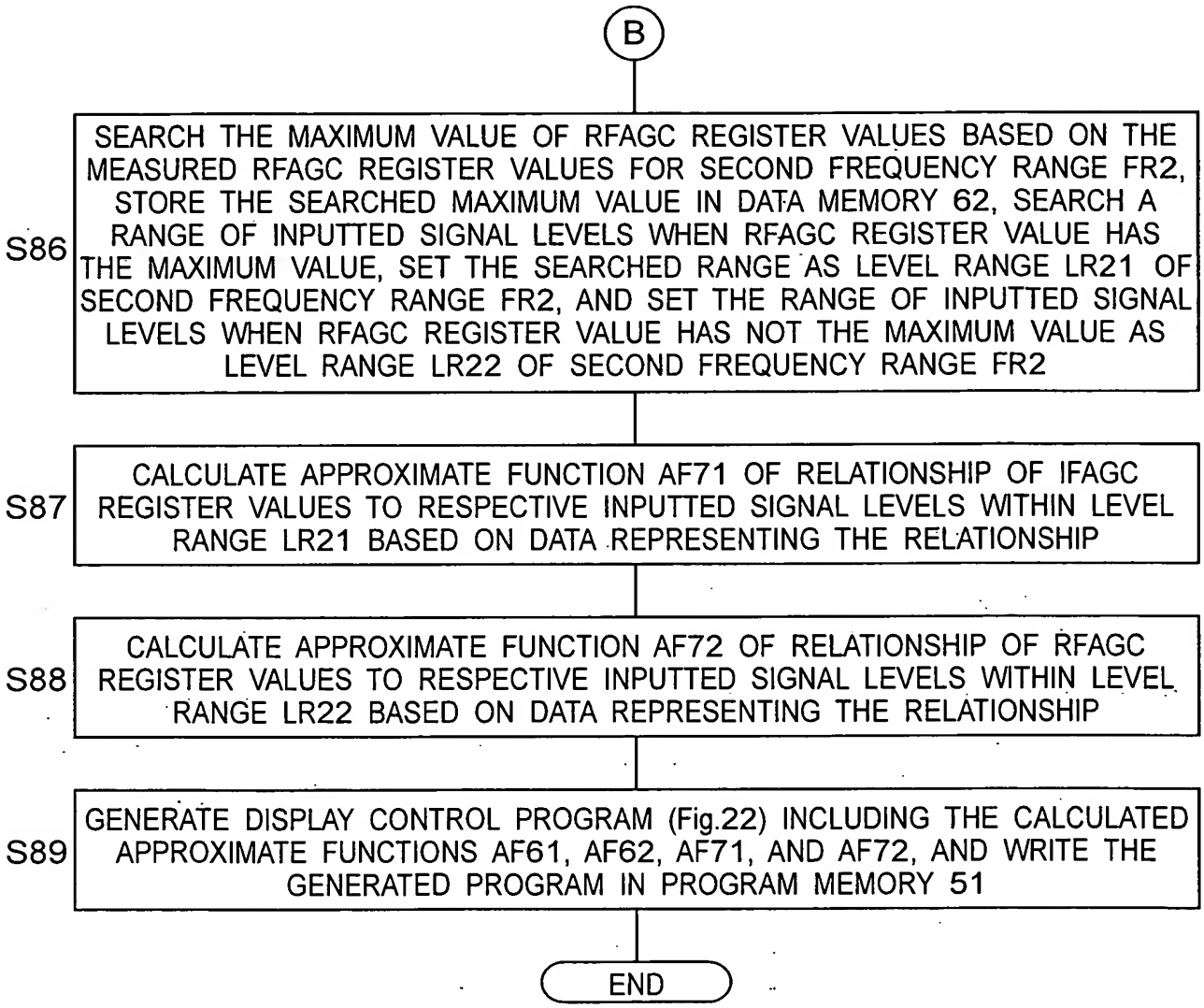

B
S86
SEARCH THE MAXIMUM VALUE OF RFAGC REGISTER VALUES BASED ON THE MEASURED RFAGC REGISTER VALUES FOR SECOND FREQUENCY RANGE FR2, STORE THE SEARCHED MAXIMUM VALUE IN DATA MEMORY 62, SEARCH A RANGE OF INPUTTED SIGNAL LEVELS WHEN RFAGC REGISTER VALUE HAS THE MAXIMUM VALUE, SET THE SEARCHED RANGE AS LEVEL RANGE LR21 OF SECOND FREQUENCY RANGE FR2, AND SET THE RANGE OF INPUTTED SIGNAL LEVELS WHEN RFAGC REGISTER VALUE HAS NOT THE MAXIMUM VALUE AS LEVEL RANGE LR22 OF SECOND FREQUENCY RANGE FR2
S87
CALCULATE APPROXIMATE FUNCTION AF71 OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN LEVEL RANGE LR21 BASED ON DATA REPRESENTING THE RELATIONSHIP
S88
CALCULATE APPROXIMATE FUNCTION AF72 OF RELATIONSHIP OF RFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN LEVEL RANGE LR22 BASED ON DATA REPRESENTING THE RELATIONSHIP
S89
GENERATE DISPLAY CONTROL PROGRAM (Fig.22) INCLUDING THE CALCULATED APPROXIMATE FUNCTIONS AF61, AF62, AF71, AND AF72, AND WRITE THE GENERATED PROGRAM IN PROGRAM MEMORY 51
END

Fig.22

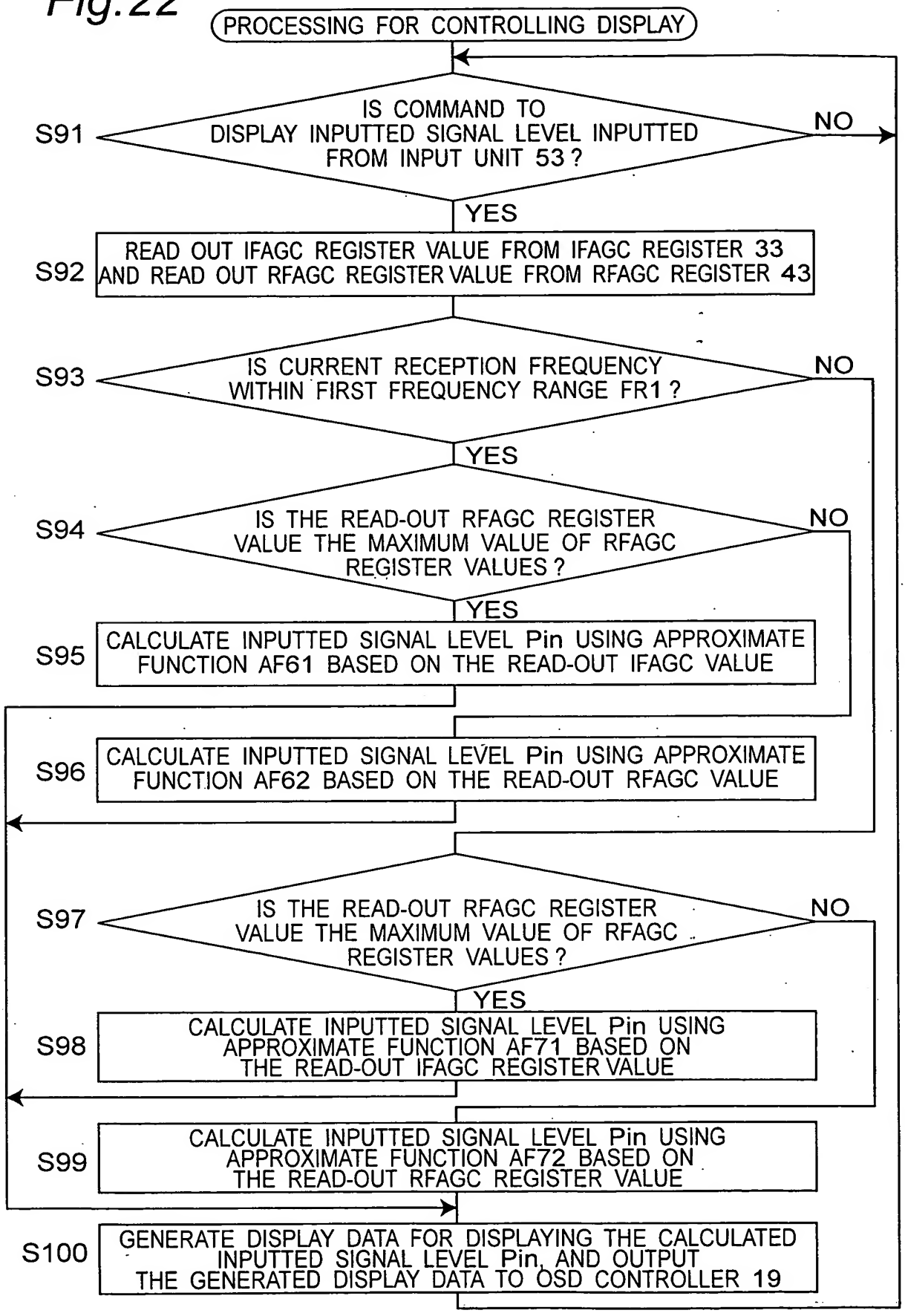

PROCESSING FOR CONTROLLING DISPLAY
S91
IS COMMAND TO DISPLAY INPUTTED SIGNAL LEVEL INPUTTED FROM INPUT UNIT 53 ?
NO
YES
S92
READ OUT IFAGC REGISTER VALUE FROM IFAGC REGISTER 33 AND READ OUT RFAGC REGISTER VALUE FROM RFAGC REGISTER 43
S93
IS CURRENT RECEPTION FREQUENCY WITHIN FIRST FREQUENCY RANGE FR1 ?
NO
YES
S94
IS THE READ-OUT RFAGC REGISTER VALUE THE MAXIMUM VALUE OF RFAGC REGISTER VALUES ?
NO
YES
S95
CALCULATE INPUTTED SIGNAL LEVEL Pin USING APPROXIMATE FUNCTION AF61 BASED ON THE READ-OUT IFAGC VALUE
S96
CALCULATE INPUTTED SIGNAL LEVEL Pin USING APPROXIMATE FUNCTION AF62 BASED ON THE READ-OUT RFAGC VALUE
S97
IS THE READ-OUT RFAGC REGISTER VALUE THE MAXIMUM VALUE OF RFAGC REGISTER VALUES ?
NO
YES
S98
CALCULATE INPUTTED SIGNAL LEVEL Pin USING APPROXIMATE FUNCTION AF71 BASED ON THE READ-OUT IFAGC REGISTER VALUE
S99
CALCULATE INPUTTED SIGNAL LEVEL Pin USING APPROXIMATE FUNCTION AF72 BASED ON THE READ-OUT RFAGC REGISTER VALUE
S100
GENERATE DISPLAY DATA FOR DISPLAYING THE CALCULATED INPUTTED SIGNAL LEVEL Pin, AND OUTPUT THE GENERATED DISPLAY DATA TO OSD CONTROLLER 19

Fig.23

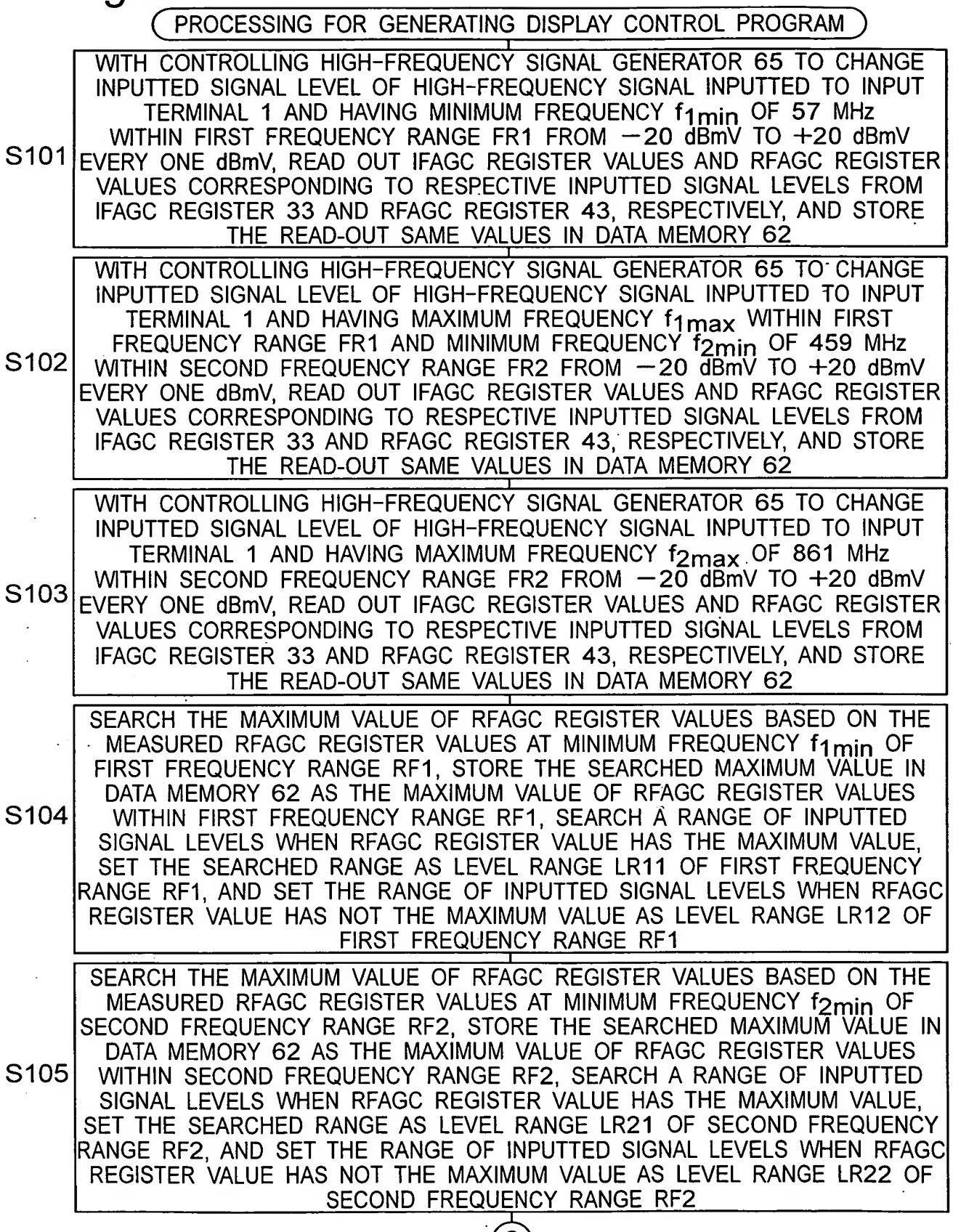

PROCESSING FOR GENERATING DISPLAY CONTROL PROGRAM
S101
WITH CONTROLLING HIGH-FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH-FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 AND HAVING MINIMUM FREQUENCY f_{1min} OF 57 MHz WITHIN FIRST FREQUENCY RANGE FR1 FROM −20 dBmV TO +20 dBmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
S102
WITH CONTROLLING HIGH-FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH-FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 AND HAVING MAXIMUM FREQUENCY f_{1max} WITHIN FIRST FREQUENCY RANGE FR1 AND MINIMUM FREQUENCY f_{2min} OF 459 MHz WITHIN SECOND FREQUENCY RANGE FR2 FROM −20 dBmV TO +20 dBmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
S103
WITH CONTROLLING HIGH-FREQUENCY SIGNAL GENERATOR 65 TO CHANGE INPUTTED SIGNAL LEVEL OF HIGH-FREQUENCY SIGNAL INPUTTED TO INPUT TERMINAL 1 AND HAVING MAXIMUM FREQUENCY f_{2max} OF 861 MHz WITHIN SECOND FREQUENCY RANGE FR2 FROM −20 dBmV TO +20 dBmV EVERY ONE dBmV, READ OUT IFAGC REGISTER VALUES AND RFAGC REGISTER VALUES CORRESPONDING TO RESPECTIVE INPUTTED SIGNAL LEVELS FROM IFAGC REGISTER 33 AND RFAGC REGISTER 43, RESPECTIVELY, AND STORE THE READ-OUT SAME VALUES IN DATA MEMORY 62
S104
SEARCH THE MAXIMUM VALUE OF RFAGC REGISTER VALUES BASED ON THE MEASURED RFAGC REGISTER VALUES AT MINIMUM FREQUENCY f_{1min} OF FIRST FREQUENCY RANGE RF1, STORE THE SEARCHED MAXIMUM VALUE IN DATA MEMORY 62 AS THE MAXIMUM VALUE OF RFAGC REGISTER VALUES WITHIN FIRST FREQUENCY RANGE RF1, SEARCH A RANGE OF INPUTTED SIGNAL LEVELS WHEN RFAGC REGISTER VALUE HAS THE MAXIMUM VALUE, SET THE SEARCHED RANGE AS LEVEL RANGE LR11 OF FIRST FREQUENCY RANGE RF1, AND SET THE RANGE OF INPUTTED SIGNAL LEVELS WHEN RFAGC REGISTER VALUE HAS NOT THE MAXIMUM VALUE AS LEVEL RANGE LR12 OF FIRST FREQUENCY RANGE RF1
S105
SEARCH THE MAXIMUM VALUE OF RFAGC REGISTER VALUES BASED ON THE MEASURED RFAGC REGISTER VALUES AT MINIMUM FREQUENCY f_{2min} OF SECOND FREQUENCY RANGE RF2, STORE THE SEARCHED MAXIMUM VALUE IN DATA MEMORY 62 AS THE MAXIMUM VALUE OF RFAGC REGISTER VALUES WITHIN SECOND FREQUENCY RANGE RF2, SEARCH A RANGE OF INPUTTED SIGNAL LEVELS WHEN RFAGC REGISTER VALUE HAS THE MAXIMUM VALUE, SET THE SEARCHED RANGE AS LEVEL RANGE LR21 OF SECOND FREQUENCY RANGE RF2, AND SET THE RANGE OF INPUTTED SIGNAL LEVELS WHEN RFAGC REGISTER VALUE HAS NOT THE MAXIMUM VALUE AS LEVEL RANGE LR22 OF SECOND FREQUENCY RANGE RF2
C

Fig.24

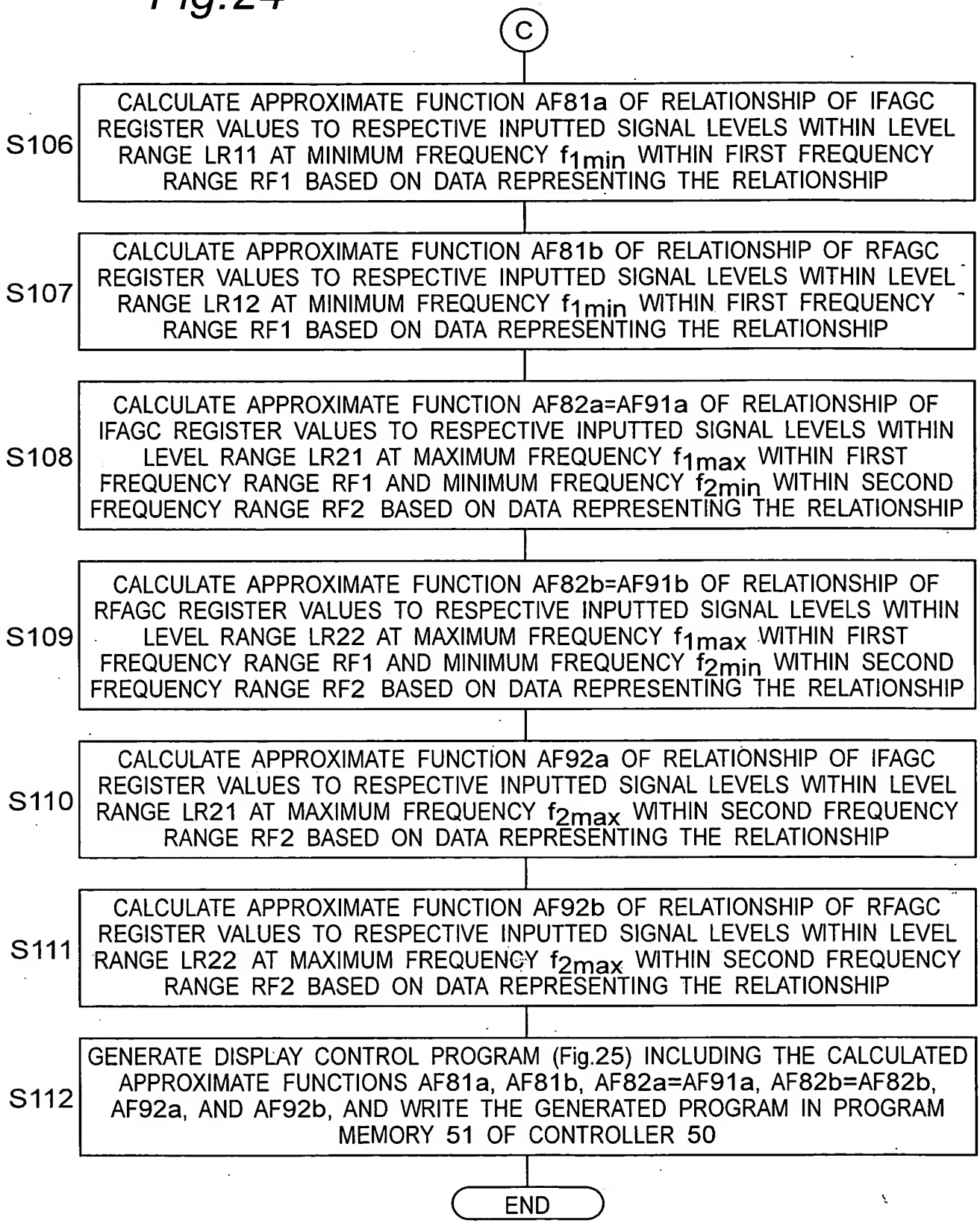

C
S106
CALCULATE APPROXIMATE FUNCTION AF81a OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN LEVEL RANGE LR11 AT MINIMUM FREQUENCY f_{1min} WITHIN FIRST FREQUENCY RANGE RF1 BASED ON DATA REPRESENTING THE RELATIONSHIP
S107
CALCULATE APPROXIMATE FUNCTION AF81b OF RELATIONSHIP OF RFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN LEVEL RANGE LR12 AT MINIMUM FREQUENCY f_{1min} WITHIN FIRST FREQUENCY RANGE RF1 BASED ON DATA REPRESENTING THE RELATIONSHIP
S108
CALCULATE APPROXIMATE FUNCTION AF82a=AF91a OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN LEVEL RANGE LR21 AT MAXIMUM FREQUENCY f_{1max} WITHIN FIRST FREQUENCY RANGE RF1 AND MINIMUM FREQUENCY f_{2min} WITHIN SECOND FREQUENCY RANGE RF2 BASED ON DATA REPRESENTING THE RELATIONSHIP
S109
CALCULATE APPROXIMATE FUNCTION AF82b=AF91b OF RELATIONSHIP OF RFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN LEVEL RANGE LR22 AT MAXIMUM FREQUENCY f_{1max} WITHIN FIRST FREQUENCY RANGE RF1 AND MINIMUM FREQUENCY f_{2min} WITHIN SECOND FREQUENCY RANGE RF2 BASED ON DATA REPRESENTING THE RELATIONSHIP
S110
CALCULATE APPROXIMATE FUNCTION AF92a OF RELATIONSHIP OF IFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN LEVEL RANGE LR21 AT MAXIMUM FREQUENCY f_{2max} WITHIN SECOND FREQUENCY RANGE RF2 BASED ON DATA REPRESENTING THE RELATIONSHIP
S111
CALCULATE APPROXIMATE FUNCTION AF92b OF RELATIONSHIP OF RFAGC REGISTER VALUES TO RESPECTIVE INPUTTED SIGNAL LEVELS WITHIN LEVEL RANGE LR22 AT MAXIMUM FREQUENCY f_{2max} WITHIN SECOND FREQUENCY RANGE RF2 BASED ON DATA REPRESENTING THE RELATIONSHIP
S112
GENERATE DISPLAY CONTROL PROGRAM (Fig.25) INCLUDING THE CALCULATED APPROXIMATE FUNCTIONS AF81a, AF81b, AF82a=AF91a, AF82b=AF82b, AF92a, AND AF92b, AND WRITE THE GENERATED PROGRAM IN PROGRAM MEMORY 51 OF CONTROLLER 50
END

Fig.25

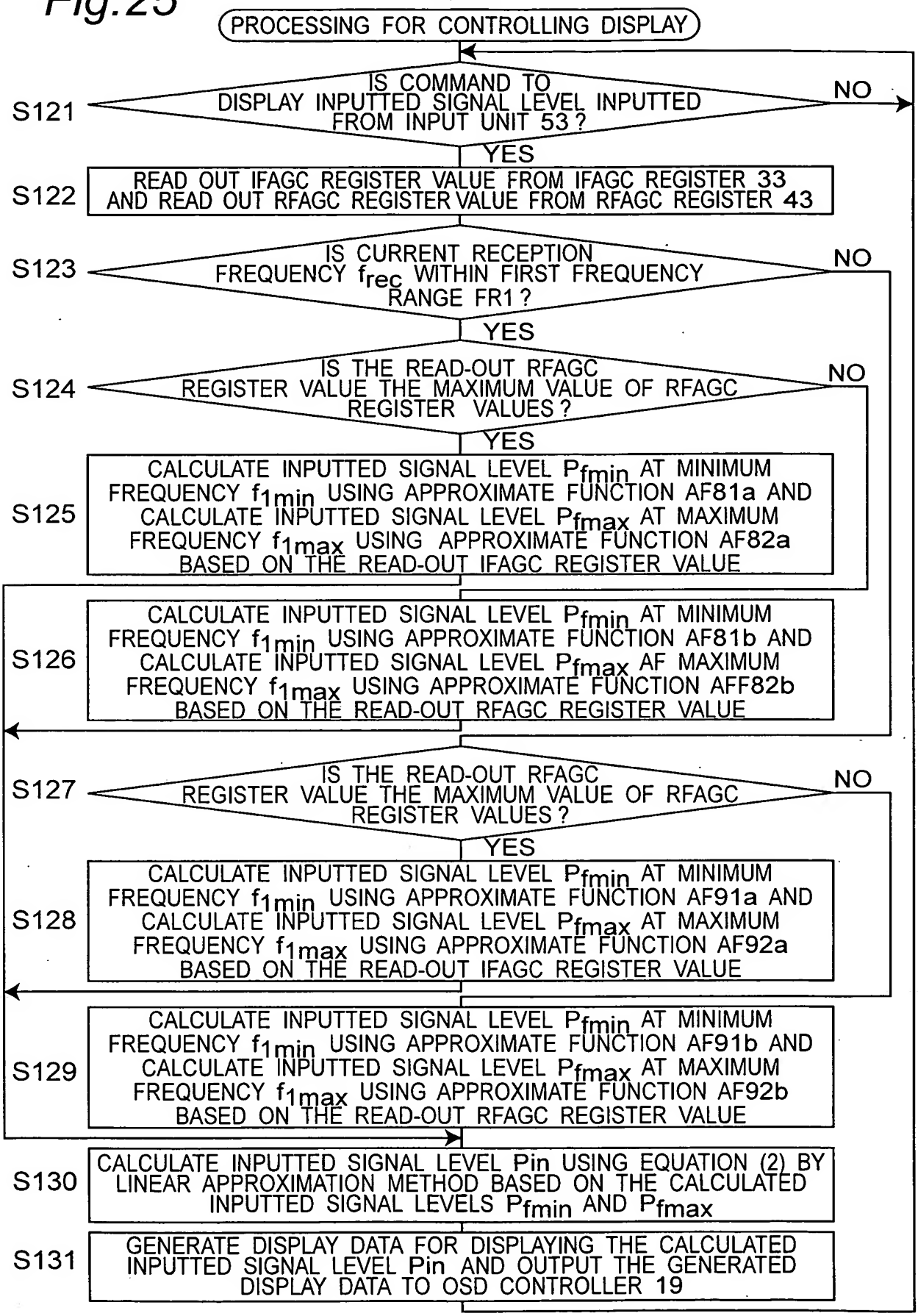

PROCESSING FOR CONTROLLING DISPLAY
S121
IS COMMAND TO DISPLAY INPUTTED SIGNAL LEVEL INPUTTED FROM INPUT UNIT 53 ?
NO
YES
S122
READ OUT IFAGC REGISTER VALUE FROM IFAGC REGISTER 33 AND READ OUT RFAGC REGISTER VALUE FROM RFAGC REGISTER 43
S123
IS CURRENT RECEPTION FREQUENCY f_{rec} WITHIN FIRST FREQUENCY RANGE FR1 ?
NO
YES
S124
IS THE READ-OUT RFAGC REGISTER VALUE THE MAXIMUM VALUE OF RFAGC REGISTER VALUES ?
NO
YES
S125
CALCULATE INPUTTED SIGNAL LEVEL P_{fmin} AT MINIMUM FREQUENCY f_{1min} USING APPROXIMATE FUNCTION AF81a AND CALCULATE INPUTTED SIGNAL LEVEL P_{fmax} AT MAXIMUM FREQUENCY f_{1max} USING APPROXIMATE FUNCTION AF82a BASED ON THE READ-OUT IFAGC REGISTER VALUE
S126
CALCULATE INPUTTED SIGNAL LEVEL P_{fmin} AT MINIMUM FREQUENCY f_{1min} USING APPROXIMATE FUNCTION AF81b AND CALCULATE INPUTTED SIGNAL LEVEL P_{fmax} AF MAXIMUM FREQUENCY f_{1max} USING APPROXIMATE FUNCTION AFF82b BASED ON THE READ-OUT RFAGC REGISTER VALUE
S127
IS THE READ-OUT RFAGC REGISTER VALUE THE MAXIMUM VALUE OF RFAGC REGISTER VALUES ?
NO
YES
S128
CALCULATE INPUTTED SIGNAL LEVEL P_{fmin} AT MINIMUM FREQUENCY f_{1min} USING APPROXIMATE FUNCTION AF91a AND CALCULATE INPUTTED SIGNAL LEVEL P_{fmax} AT MAXIMUM FREQUENCY f_{1max} USING APPROXIMATE FUNCTION AF92a BASED ON THE READ-OUT IFAGC REGISTER VALUE
S129
CALCULATE INPUTTED SIGNAL LEVEL P_{fmin} AT MINIMUM FREQUENCY f_{1min} USING APPROXIMATE FUNCTION AF91b AND CALCULATE INPUTTED SIGNAL LEVEL P_{fmax} AT MAXIMUM FREQUENCY f_{1max} USING APPROXIMATE FUNCTION AF92b BASED ON THE READ-OUT RFAGC REGISTER VALUE
S130
CALCULATE INPUTTED SIGNAL LEVEL Pin USING EQUATION (2) BY LINEAR APPROXIMATION METHOD BASED ON THE CALCULATED INPUTTED SIGNAL LEVELS P_{fmin} AND P_{fmax}
S131
GENERATE DISPLAY DATA FOR DISPLAYING THE CALCULATED INPUTTED SIGNAL LEVEL Pin AND OUTPUT THE GENERATED DISPLAY DATA TO OSD CONTROLLER 19

Fig.26

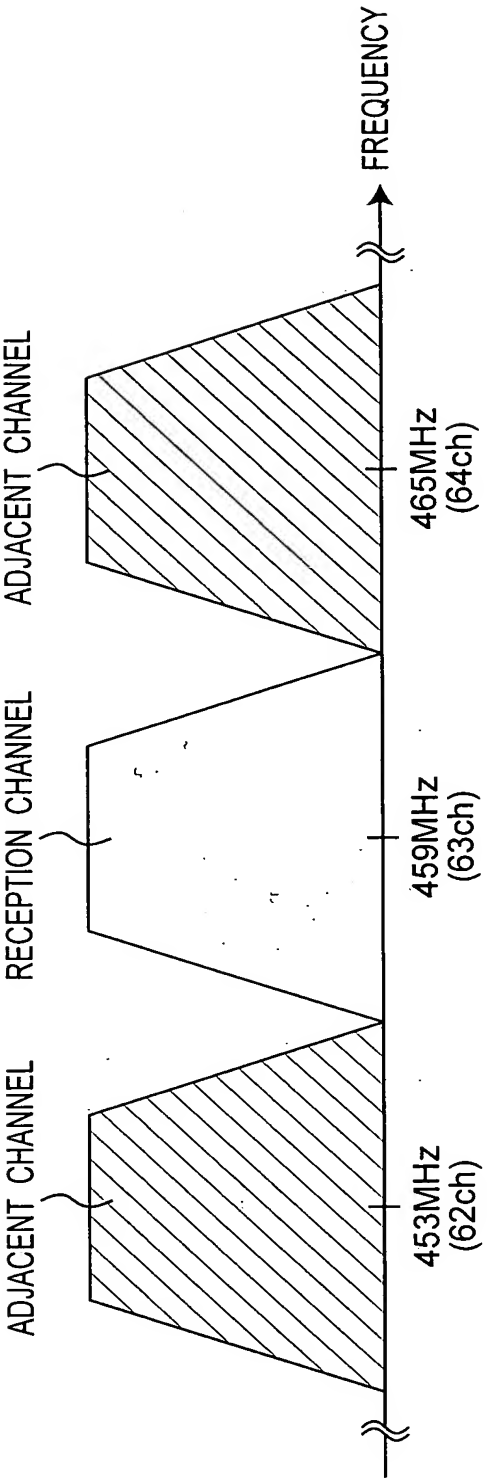
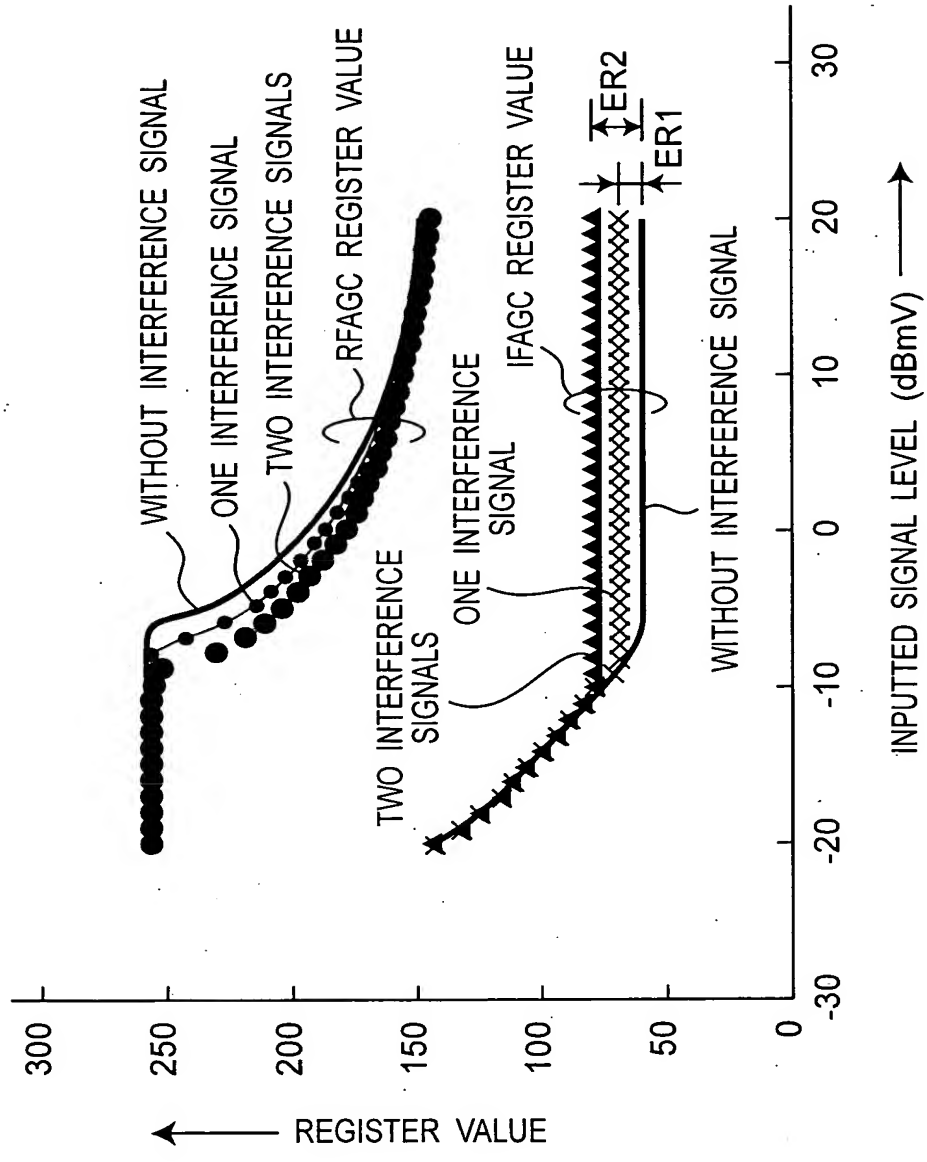

FREQUENCY
ADJACENT CHANNEL
RECEPTION CHANNEL
ADJACENT CHANNEL
453MHz
(62ch)
459MHz
(63ch)
465MHz
(64ch)

Fig.27


WITHOUT INTERFERENCE SIGNAL
ONE INTERFERENCE SIGNAL
TWO INTERFERENCE SIGNALS
RFAGC REGISTER VALUE
TWO INTERFERENCE SIGNALS
ONE INTERFERENCE SIGNAL
IFAGC REGISTER VALUE
ER2
ER1
WITHOUT INTERFERENCE SIGNAL
300
250
200
150
100
50
0
REGISTER VALUE
-30
-20
-10
0
10
20
30
INPUTTED SIGNAL LEVEL (dBmV)

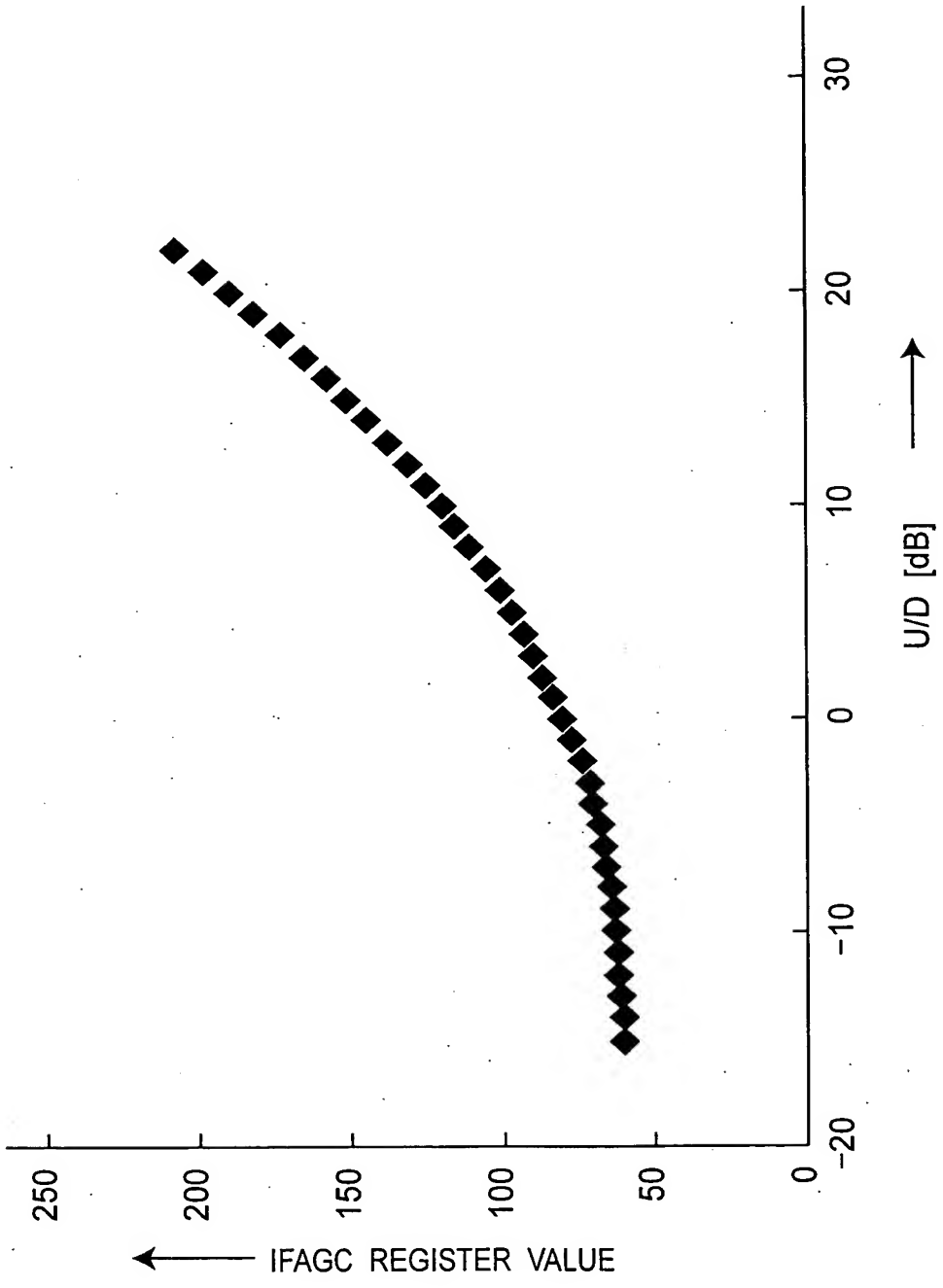


Fig.28

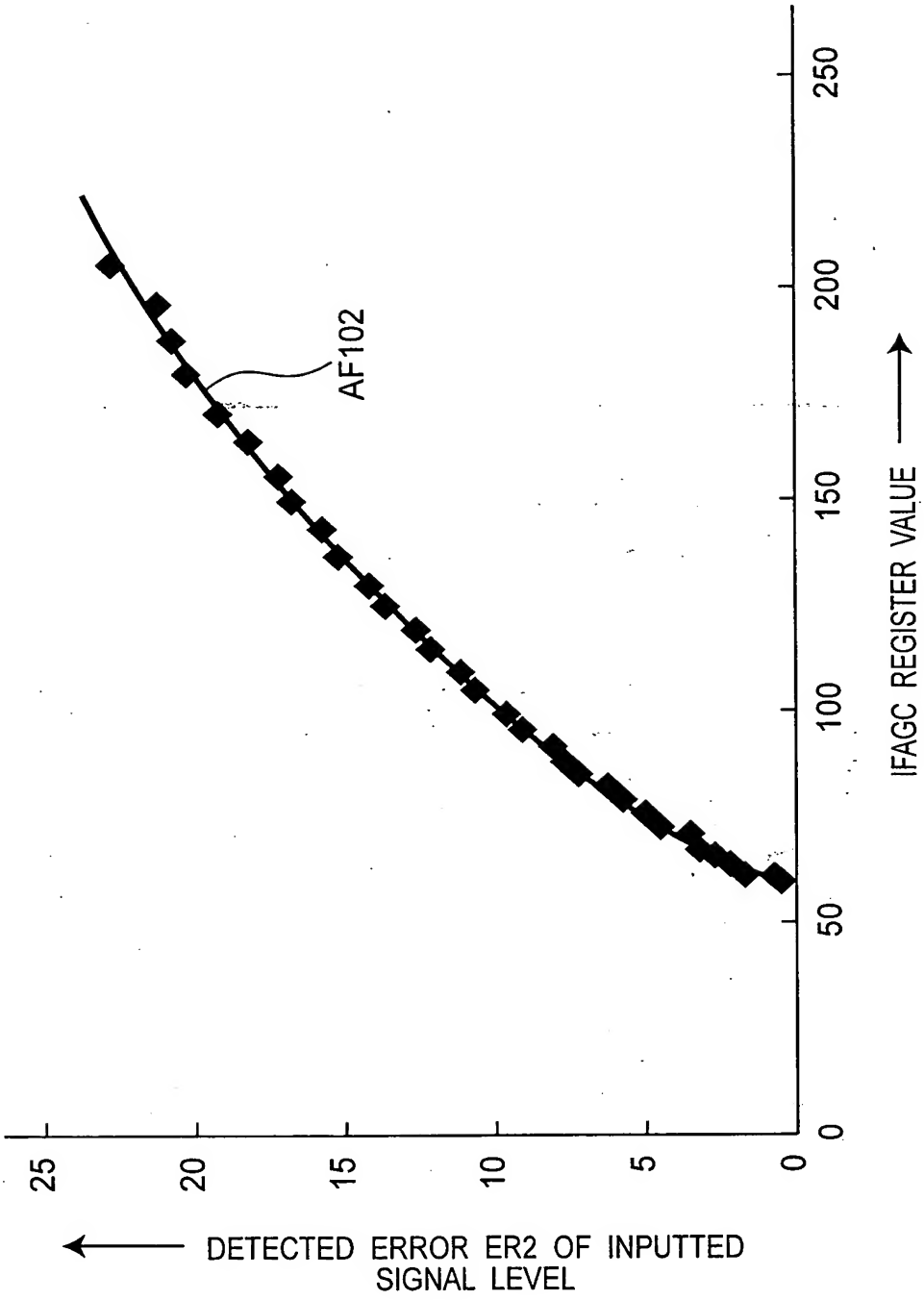
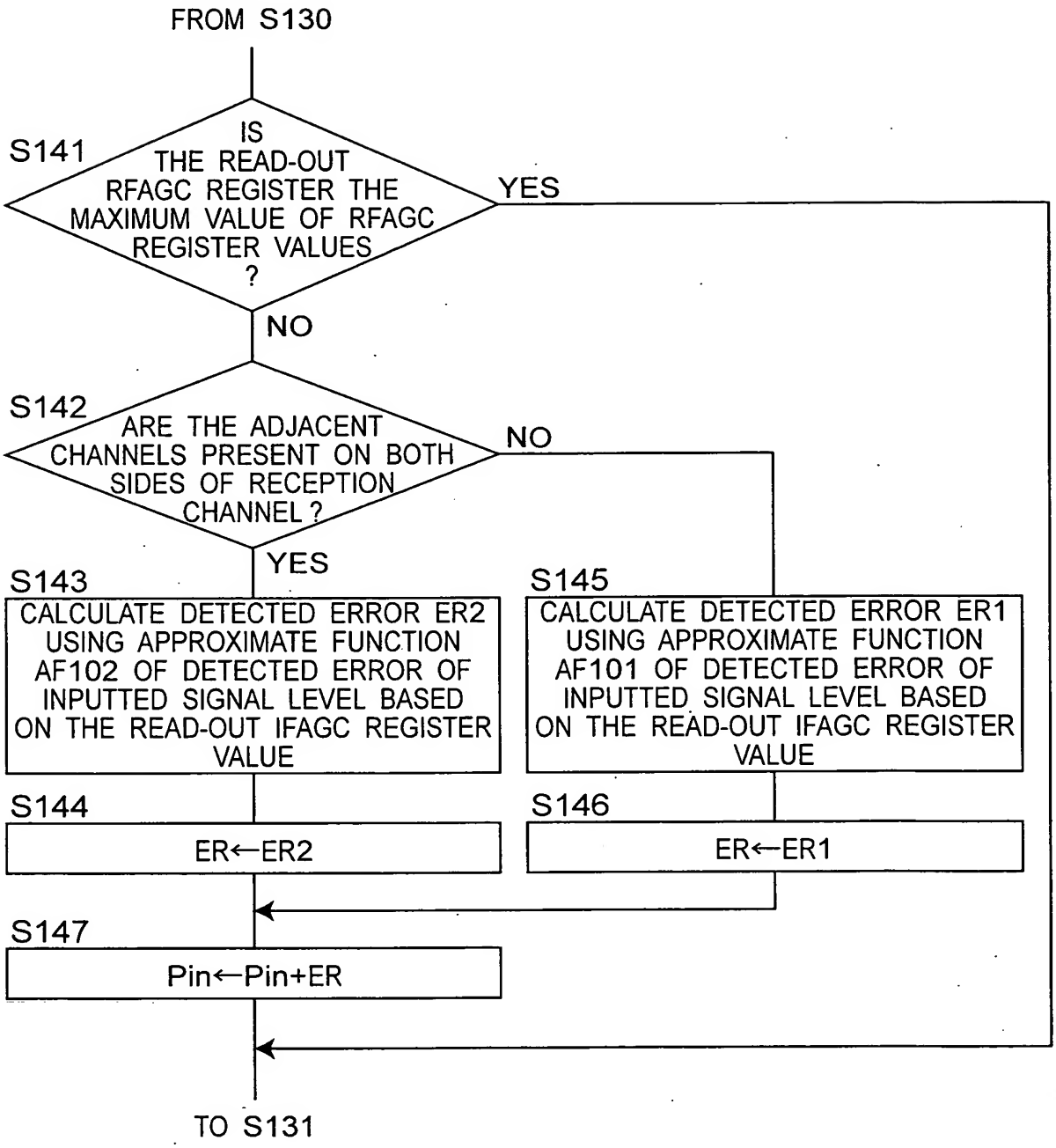

AF102
250
200
150
100
50
0
IFAGC REGISTER VALUE
25
20
15
10
5
0
DETECTED ERROR ER2 OF INPUTTED SIGNAL LEVEL

Fig.29

Fig.30


FROM S130
S141
IS THE READ-OUT RFAGC REGISTER THE MAXIMUM VALUE OF RFAGC REGISTER VALUES ?
YES
NO
S142
ARE THE ADJACENT CHANNELS PRESENT ON BOTH SIDES OF RECEPTION CHANNEL ?
NO
YES
S143
CALCULATE DETECTED ERROR ER2 USING APPROXIMATE FUNCTION AF102 OF DETECTED ERROR OF INPUTTED SIGNAL LEVEL BASED ON THE READ-OUT IFAGC REGISTER VALUE
S145
CALCULATE DETECTED ERROR ER1 USING APPROXIMATE FUNCTION AF101 OF DETECTED ERROR OF INPUTTED SIGNAL LEVEL BASED ON THE READ-OUT IFAGC REGISTER VALUE
S144
ER←ER2
S146
ER←ER1
S147
Pin←Pin+ER
TO S131